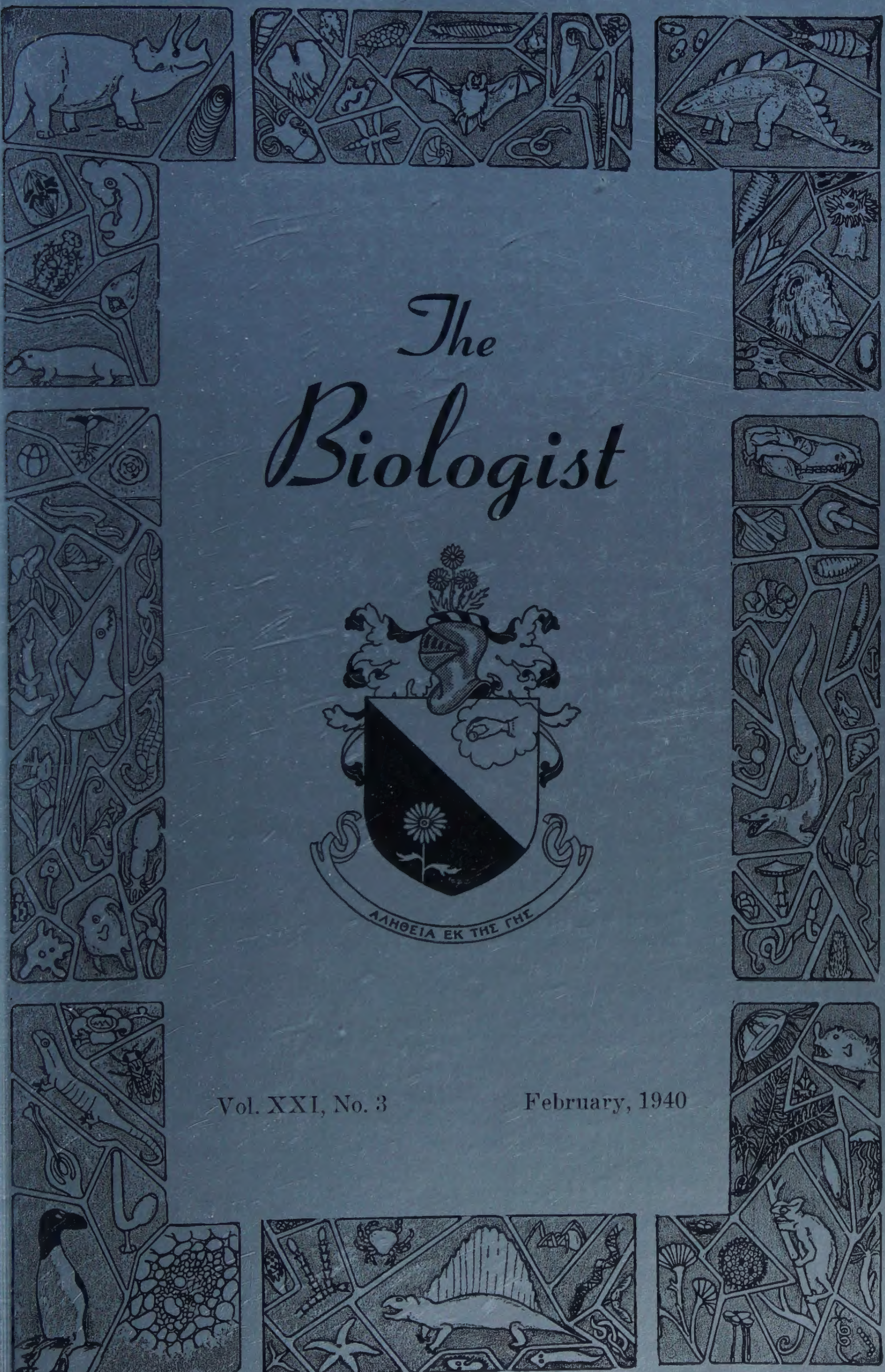
ANNIVERSARY ISSUE



The Biologist

Vol. XXI, No. 3 February, 1940

ABSTRACTS OF PAPERS

Phi Sigma

BIOLOGICAL HONOR SOCIETY

"The object of Phi Sigma is to promote interest in biological research. Although originally designated as an honorary biological research society, it should now be considered as a working guild of biologists interested in research. In effect, election to Phi Sigma should be an opportunity for better work, rather than merely election to an honorary society."

Mile Posts:

1915	March 17, Alpha Chapter organized, Ohio State University, Columbus.
1916	May, Central Governing Body organized, BIOLOGIST first issued.
1917	June, last War-time BIOLOGIST issued.
1921	February, BIOLOGIST revived.
1924	December, First National Meeting, Constitution revised, Washington, D. C.
1925	December, Second National Meeting, First Scientific Program, Kansas City.
1926	December, Third National Meeting, Second Science Program, Philadelphia.
1927	December, Third Science Program, Nashville.
1928	December, Fourth National Meeting, Coat-of-Arms adopted, Fourth Science Program, New York.
1930	January, Council Meeting, Ritual Revised, Norman, Okla.
	December, Fifth National Meeting, Fifth Science Program, Cleveland.
1931	Phi Sigma Letters Registered, U. S. Patent Office.
1932	December, Sixth Science Program, Atlantic City.
1933	June, Sixth National Meeting, Seventh Science Program, Chicago.
1935	December, Seventh National Meeting, Eighth Science Program, St. Louis.
1937	December, Eighth National Meeting, Ninth Science Program, Indianapolis.
1939	December, Ninth National Meeting, Tenth Science Program, Silver Anniversary, Ohio State University, Columbus.

Expansion:

The Constitution provides that: "An active chapter may be established in any institution of learning which requires for graduation the equivalent of four years of collegiate work, and which is equipped with facilities for research work. - - - - Any petitioning group must be active for at least one year before it may be granted a charter."

THE BIOLOGIST

Vol. XXI Denver, Colo., February, 1940 No. 3

Published by the Phi Sigma Society, an organization devoted to the promotion of interest in biological research, founded at Ohio State University, March 17, 1915. The Biologist is the official quarterly publication of the society, issued ordinarily in October, December, February and April, as a medium of exchange between chapters, as an interpreter of Council policies, and as a stimulus to the fellowship in science for which Phi Sigma stands.

Council

HONORARY PRESIDENT

Dr. Leon J. Cole (Zeta '25)
Professor of Genetics,
University of Wisconsin,
Madison, Wisconsin

CHANCELLOR

Dr. Paul A. Warren (Beta '20)
Botany Department,
Tufts, College,
Medford, Massachusetts

VICE-CHANCELLOR

Dr. Fred A. Barkley (Omega '28)
University of Montana
Missoula, Montana

SECRETARY

Dr. A. I. Ortenburger (Beta '19)
Zoology Department,
University of Oklahoma,
Norman, Oklahoma

TREASURER

Erwine Hall Stewart (Epsilon '17)
Mesa, Colorado

EDITOR

Dr. Anselm M. Keefe (Zeta '24)
St. Norbert College,
West DePere, Wisconsin

Contents

SPECIAL FEATURES

Dr. Leon J. Cole—Our New President 103
The Scientist as Citizen 104
Dr. Paul B. Sears
Omega on the Air 113
10,000th Phi Sigma 114
The Green Folk, a Fantasy 116
Dr. Carl D. LaRue
The Beta Scholarship 123
Minutes of the National Meeting 124
Directory of Honorary Members 129

REGULAR FEATURES

Editorials 133
Abstracts of Meeting Papers 134
New Books 135
Advertising ..... Back Cover

Directory

OF ALL ACTIVE AND INACTIVE CHAPTERS

The list of chapter officers will be found in the CHAPTER NEWS section

---

ALPHA

Ohio State University, Columbus, Ohio, founded March 17, 1915, (Inactive).

BETA

University of Michigan, Ann Arbor, Michigan, founded June 3, 1916.

DELTA

University of Maine, Orono, Maine, founded January 27, 1917.

EPSILON

University of Denver, Denver, Colorado, founded March 5, 1917.

ZETA

University of Wisconsin, Madison, Wisconsin, founded May 30, 1917.

ETA

University of Akron, Akron, Ohio, founded April 20, 1921.

THETA

Michigan State College, East Lansing, Michigan, founded April 9, 1921.

IOTA

Washington University, St. Louis, Missouri, founded May 28, 1921.

KAPPA

University of Kansas, Lawrence, Kansas, founded May 31, 1921.

LAMBDA

University of Montana, Missoula, Montana, founded May 4, 1921.

MU

University of California, Berkeley, California, founded April 27, 1922.

NU

Washington and Jefferson College, Washington, Pennsylvania, founded May 11, 1922.

XI

University of Nebraska, Lincoln, Nebraska, founded May 3, 1934.

OMICRON

University of North Dakota, Grand Forks, North Dakota,
founded May 26, 1924, (Inactive).

PI

Emory University, Georgia, founded January 3, 1925.

RHO

University of Illinois, Urbana, Illinois, founded March 28, 1925.

SIGMA

University of Florida, Gainesville, Florida, founded December 4, 1925.

TAU

Duke University, Durham, North Carolina, founded March 4, 1926.

UPSILON

Miami University, Oxford, Ohio, founded May 7, 1926.

PHI

University of New Hampshire, Durham, New Hampshire, founded May 21, 1926.

CHI

Montana State College, Bozeman, Montana, founded February 11, 1927.

PSI

University of Washington, Seattle, Washington, founded April 7, 1928.

OMEGA

University of Oklahoma, Norman, Oklahoma, founded March 24, 1928.

ALPHA ALPHA

University of Southern California, Los Angeles, California, founded May 17, 1930.

ALPHA BETA

Mount Union College, Alliance, Ohio, founded May 17, 1928.

ALPHA GAMMA

University of South Dakota, Vermillion, South Dakota, founded May 15, 1928, (Inactive).

ALPHA DELTA

Lawrence College, Appleton, Wisconsin, founded March 7, 1929.

ALPHA EPSILON

University of Pittsburgh, Pittsburgh, Pennsylvania, founded March 23, 1929.

ALPHA ZETA

College of William and Mary, Williamsburg, Virginia, founded April 19, 1930.

ALPHA ETA

Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma, founded March 13, 1930.

ALPHA THETA

State College of Washington, Pullman, Washington, founded May, 1930.

ALPHA IOTA

Bucknell University, Lewisburg, Pennsylvania, founded January 9, 1932.

ALPHA KAPPA

Hunter College, New York City, founded January 8, 1932.

ALPHA LAMBDA

University of Utah, Salt Lake City, Utah, founded February 13, 1932.

ALPHA MU

University and State College of Oregon, Eugene-Portland-Corvallis, Oregon, founded November 18, 1933.

ALPHA NU

University of New Mexico, Albuquerque, New Mexico, founded April 21, 1935.

ALPHA XI

Rhode Island State College, Kingston, Rhode Island, founded May 17, 1935.

ALPHA OMICRON

Marquette University, Milwaukee, Wisconsin, founded June 18, 1938

Dr. Leon J. Cole, Ph.D.

Our New President

Dr. Leon J. Cole, Ph.D., newly elected President of Phi Sigma, presided at the Silver Anniversary banquet in the Fort Hayes Hotel, Columbus, which closed the ninth National Meeting. Dr. Cole was the recipient of another honor at the Columbus meetings of the American Association for the Advancement of Science, in his election to the vice presidency of Section F, devoted to the Zoological sciences.

Dr. Cole is a native New Yorker, born in Allegany, June 1, 1877. He did his undergraduate work at Michigan State receiving his A.B. in 1901. While there he was an assistant in zoology for three years, and then went on to Harvard where he was Austin Teaching Fellow from 1903 to 1905, and won the Ph.D. in 1906.

After a year at Rhode Island State College, he went to Yale University's Sheffield School of Science as instructor in zoology. In 1910 he began his career at Wisconsin in the department of experimental breeding, becoming professor of genetics in 1918. He has been associated at times in the work of the National Research Council, the U. S. Department of Agriculture, and the U. S. Bureau of Fisheries. He has been on two expeditions, the Harriman to Alaska in 1899 and a zoological expedition in Yucatan, in 1904. He is a member of some seventeen national scientific societies, and has held office in more than half of them.

While he began his early scientific research on the marine spiders, the pycnogonids, and the vertebrates of Yucatan, he has gradually shifted his interests first to experimental animal breeding and then to genetics. He has made a scientific hobby of bird-banding, and has been the president of Bird-Banding Association.

On Dec. 3rd 1939 his portrait in oils was hung in the Chicago Saddle and Sirloin Club Portrait Gallery in recognition of his work in educational research in animal production.

Man of Science As a Citizen

By Dr. Paul B. Sears, Alpha '16

(The address of the evening at the Silver Anniversary Banquet, held at the Fort Hayes Hotel, Columbus, Ohio, Saturday, December 30, 1939, was delivered appropriately enough by one of the first initiates after the foundation of Alpha Chapter at Ohio State University. Dr. Sears succeeded the late Dr. Ira E. Cutler, of Denver, Colorado, as National President early in 1928. He held that office until it was changed to the National Chancellorship in the winter of 1930. He retired from his new office in 1933. Since then he has become a national figure through his books, notably "Deserts on the March". He is professor of botany at Oberlin.)

THE Man of Science as a Citizen
Phi Sigma Silver Anniversary Dinner
By Paul B. Sears
Columbus, Ohio, December 30, 1939.

The anniversary which we celebrate tonight had its origin in the fact that a group of young cubs in the science departments at Ohio State University were not only interested in themselves and their work, but in each other. Such, I suppose, is the basis of all citizenship. The great annual meetings of the American Association for the Advancement of Science are an expression of the same sort, on a national scale.

If science is not a social phenomenon, it is nothing. The laboratory is a sort of uterus, while experiment and study represent a period of gestation. Until the results are placed before someone who comprehends them, there is no birth. Doubt, test, and tell; doubt, test, and tell—this is the eternal round of scientific procedure. There cannot be just one man of science. There must always be two or more.

All of this has been said many times. It is the reason why, as a profession, we place so much stress upon publication, even at the cost of occasional injustice. But my purpose in saying it again is to remind ourselves that the scientist is ex-officio as well as personally a citizen in the world of men, no matter how much he may rail at politics. Perhaps it will help if we recall Plato's dictum that all men are philosophers, too. "For" said he "even the man who says 'I am no philosopher' thereby expresses a philosophical judgment".

I come before you to inquire, not whether the scientist be a citizen, but what manner of citizen he is and ought to be. This is not a trivial matter, with the whole civilized world threshing about in blind agony trying to find peace and justice. The new milieu which scientific discovery has provided for us is as different from the old as land from water. The old human ways of thinking and doing are many of them as ill-fitted for this new world as the first crude amphibian was fitted to roam and breed in the woods. For the past three hundred years, and for the first time in human history, the fitness of the cultural environment has changed faster than our culture could make the adjustment. The result has been that men have had to try inventing new social patterns under pressure instead of allowing them to evolve deliberately as was the older way.

Our own democratic pattern is such an invention, worked out of old Roman and Teutonic metal by applying the social formulae current in a world neatly set in order by the genius of Sir Isaac Newton. Sturdy and inquisitive Ben Franklin, pioneer in the troublesome business of creating new disorder through experiment, was present and speaking when all of this happened. Although he wished to control the ancient evils of wealth and social injustice which any man could see, thus clearing the way for new problems as they came, he was overruled. And so we have carried along more of the old pattern than we ought, and we are paying heavily for the encumbrance.

Today this democracy, so laden, is defending the dignity of the individual against a new invention—that of national socialism. Perhaps it is less an invention than a fabrication, combining archaic barbarisms with modern efficiency. Certainly it is compounded of Oriental despotism, Roman discipline, pagan voodoo, and modern science. But the science, no longer free, is chained to the will of the State as that will finds expression in the acts of a dictator. Men of science in some countries today literally work with commissars following them about and peering over their shoulders. If these are conditions under which men of science in democratic countries can afford to take lightly their own free citizenship, then I am mistaken.

We can dramatize the picture, I suppose, by taking parts of two familiar quotations. "But this, above all else, to thine own self be true" may have been mouthed about until it is trite, but it expresses the germ of the democratic faith in the individual. "My country, right or wrong"—go no further with this noble quotation and you have a perfect rallying cry for national socialism.

What Polonius really told Laertes in Shakespeare's Hamlet was:

> "But this above all else, to thine own self be true
> And it must follow, as the night the day,
> Thou canst not then be false to any man."

It is the weakness of democracy that it has too often looked upon the individual as the whole end in himself, complete and detached from the structure of the society of which he is a part. Not otherwise can we explain the reign of unlicensed individualism and personal advantage. It has been profitable—far too profitable—to do things which have worked against the common good. We have not considered the final end of fidelity to self. This end is responsible conduct towards others. We have misread our Shakespeare and warped the meaning of our own charter.

The famous toast of Commander Stephen Decatur ran thus, "Our country! In her intercourse with foreign nations may she always be right. But, right or wrong, our country!" Here, be it observed, is not a program of political action, but the creed of a gallant naval officer, bound professionally by a narrow and rigid, but sacrificial code. To this code he himself fell victim by his untimely death in a duel.

It is a second great weakness of democracy to have vaunted itself as being always in the right, without pausing for self-criticism. Whether locked in commercial rivalry with our Mother-Country, exterminating the

Indians, robbing Mexico, or appropriating the Islands of the tottering Spanish Empire, we have always been right and righteous. As to our participation in the First World War, let me suggest to you the reading of two recent books—Propaganda for War, by Peterson, and Words that Won the War, recently issued by the Princeton University Press. I am certain you will agree that in our national behaviour before and during that great conflict, there was little enough of the cool, rational self-criticism which is the ear-mark of responsible and intelligent conduct.

There is yet a third great defect in our democratic way of living, suggested also by the great Commander's toast. To him and his brother officers the idea of duty was paramount. This idea has been freshly brought to our attention by the drama of recent naval activities in the Second World War. But in civil life, in our own country, it is my regretful conclusion that the ancient and homely word "duty" is for the time being outmoded and in bad favor.

No one knows better than I how it can be abused and made an instrument of oppression. Like the idea of individual freedom, the idea of duty has the defects of its own virtue. Carry either idea to the extreme and it becomes dangerous. The problem is one of balance.

If you travel in comfortable circles, you learn quickly enough that the idea of duty has vanished from the rank and file of those who do not live comfortably. You are told that they all want something for nothing, that they are unwilling to be dutiful industrious citizens as the ancestors of those who sit in well-upholstered chairs presumably were. Quite possibly your comfortable informant is drinking a Scotch and soda which has cost more than the daily food allowance of one of the poor devils he is talking about.

Somehow the social commentaries of such people leave me strangely cold. I am conservative by inheritance, temperament, and habit. But I conceive that the first obligation of those who would conserve is to place themselves under an exemplary discipline. And one of the cardinal points of this discipline is a sense of responsibility if not of compassion for those who are less fortunate. In a democracy this does not mean a lot of sentimental Lord and Lady Bountiful business. Such business may have its points, but as a rule it further degrades those who already wear chains. The discipline I am talking about means helping others to help themselves. It means, if you can afford to send your children to private schools, that you ought to get busy first and see that the local public schools are fit places for the children of your less prosperous neighbors. It means, if your living comes from the labors of others, that you at least ought to know something of the conditions under which *they* live. It means that if you control great natural resources of this country, you concern yourself, not simply with the greatest profit in the shortest possible time, but with your responsibility as a trustee. It means, if you are dissatisfied with the conduct and quality of the politicians who represent you, that you ought to do something about it. In my experience with politicians, which is considerable, I find them as good as people will allow them to be.

These are after all merely measures of enlightened self-interest. Neglect the neighborhood school and you will soon be paying for more jails, police protection, and relief. Ignore the living conditions of workmen and your community will be torn with industrial strife. The racketeer, as distinct from the decent labor leader, comes in at the window only after human kindliness and concern for others has walked out through the door. Ruin the natural resources which you are developing and your business eventually folds up, for natural resources have their limits. Rely upon unscrupulous politics to gain your ends—you will find your obliging slave has become your tyrannous master before you are through. In saying these things I have specific examples in mind at every step. We cannot get on without accepting the bonds of duty, and this is an obligation which begins, not at the bottom, but at the top of society.

Such are some of the simple principles of citizenship, as I view them. What does this have to do with the man of science?

Recently a friend of mine, practical and capable, was talking of his experiences in a great institution. "Every time there was a clear-cut issue of social justice which developed, the scientists ran out on us and hid themselves, to a man", said he. Let me read you also the words, perhaps not too temperate, of a sociologist, written some six years ago. They were published under the same title as my talk to night, but I did not know it until I started scanning the records in preparation.

" . . . the scientist is citizen as well as scientist . . . He is the dynamic agent in our culture, the most powerful single factor in the most rapidly changing culture that has ever graced or disgraced this planet. If he is a bad citizen, we shall have a bad society. If he is bad enough, the social order that supports him will crumble and the proud structure of our science-conjured civilization will crash to ruin, destroying the scientist along with his bedazzled worshippers.

"Scientists, with few notable exceptions are the worst citizens of the Republic; they, more than any other single factor, threaten the persistence of Western culture. They are wholesale, though unconscious, traitors to the civilization they have created . . .

"What is the proof of this? They do not vote; they sneer at politics and politicians. They poke fun at preachers and 'other moralists'. They laugh at education which pays a goodly portion of their salaries. They sell their services to the exploiters of human life. They make a fetish of 'research' and 'scientific method'. They produce powerful mechanisms and proudly proclaim that they do not care how they are used—'leave that to the moralists.' They are blatantly a-moral, un-moral, or non-moral; they boast of their unutilitarian purposes; they refuse to tell people what they 'ought to do';—that would be 'unscientific'. They are parasites upon the body politic but they refuse to accept any political responsibility. Universities may discharge professors who run for office or champion unpopular causes, and the scientists meekly submit. They think tolerance and lack of conviction are synonymous . . .

"If a man of science tries actively to promote what seems to him the good life, his fellow scientists look askance, lift the eye-brow of scorn and read him out of the party. He becomes out-cast, renegade, pariah, to the cult one of whose unwritten laws is that 'no true scientist is directly concerned with human welfare'. 'You are *advocating* something—do you call that *scientific?*' . . .

"As individuals, scientists take their civic responsibilities very lightly; as groups, they refuse to admit that they have any.

"This is the Great Betrayal. Scientists are the inspired prophets and logical leaders of an age whose religion is science. If they continue to manufacture their dangerous toys and allow the quacks, racketeers, corrupt politicians, exploitive industrialists and stupid populace to use them undirected, the end is inevitable and inescapable disaster. Unless scientists in every field develop a high degree of social intelligence, replace their moral apathy with enlightened moral fervor, and take their rightful place as prophets and promoters of the good life, Western life is doomed to slow decay and final destruction.

"And it may not be so slow!"*

This is a bitter indictment. But perhaps we can temper it and point the issue by quoting from another sociologist.

"The influence of the sociological method on everyday life should be tremendous. This, however, postulates a functional participation different from the activities of the person who is not a sociologist. The role of the sociologist is that of the specialist, in which he can make a contribution that is greater than is possible when he steps out of this role and plays the same part the non-sociologist plays.

"There is available to the sociologist a way of being interested that is not accessible to the untutored. His point of view gives him an avenue of participation that the layman does not have . . .

"To the sociologist the scientific method is the chief means by which social problems will be solved, behaviour altered, and national social change achieved. The sociologist is not handicapped by having to defend or attack patterns of behaviour. To him perverse behaviour is not annoying as it is to the average citizen. It is data to be studied, understood and explained . . .

"The sociologist does not approach a 'sick society' taking sides and denouncing the manifested behaviour. His technique is not chronic criticism but study, understanding and explanation. Anyone can condemn and take sides . . .

"The sociologist can be very much interested in human well-being and remain a sociologist. A scientific explanation is not a lack of interest—it shows the greatest interest one can have, and through it the greatest contribution can be made . . . The social definition gives him (the sociologist) status as a professional functionary—one to be consulted when expert information is wanted. This position can be achieved by the sociologist only when he ceases to be an ordinary citizen in relation to social problems."*

I am inclined, at least for the present, to agree with my colleague last quoted that the scientist, whether a student of society or something else, is not an ordinary citizen. As a matter of fact, I doubt whether there are any ordinary citizens, for each must serve the community in the way he can. The scientist is no exception. The issue is what he can do and how he can do it. Practically things seem to boil down to this—shall the man of science take part actively in crusades for social betterment, engage in practical political life—or shall he serve only by giving society the benefit of his expert opinion and leaving the application to others?

That he must at all costs protect his integrity as a specialist adviser is self-evident. However, shall he serve with the combat troops or only on the staff?

---

* Bain, Read. Scientist as Citizen. *Social Forces* 11: 412-15. 1932-33.

* Brown, L. Guy. Personal communication.

Or, to put it bluntly, shall he suspend all moral judgments and be content to make clear the material consequences of the moral judgments others may render? I am using the word moral in a very old, but permanent sense, so perhaps a bit of history is necessary to make clear its meaning.

Long ago knowledge was divided into the known record—history—and that which could be inferred by reflection and experiment—philosophy. In both fields there was knowledge that involved human choice and feeling—moral—and that which was impersonal—natural. So observe the four combinations:

Moral history—the record of human events.
Natural history—the record of the natural world, aside from men.
Moral philosophy—the laws and consequences of human behaviour.
Natural philosophy—the experimental and theoretical study of nature.

By usage, natural history became modern geology and biology; natural philosophy became the mathematical and physical sciences. Needless to say the breaking down of this sharp distinction in natural knowledge began long ago, too, and is today one of the most fruitful phases of scientific work.

Today the world faces a much more difficult problem. Shall we move ahead to break down the great barrier between the moral and the natural? Has the scientist any business with the way in which his discoveries are applied? This is the basis of the famous suggestion that science take a holiday until the world can catch up. It is at the root of the condition which is so distressing to President Conant of Harvard—the neglect of the sciences in favor of the social sciences by his students. It is the reason why the Nazi party discriminates between Jewish and Aryan science, and presumes to see only truth in the chromosomes, only lies in modern anthropology with its evidence that men are shaped by their surroundings and that a pure race is a myth. It accounts for the precisely opposite view advanced in Soviet Russia. It is in brief, one of the living issues of our day. Has the scientist any business with moral matters, which is to say, with human values?

The stock answer is that values are beyond the ken of science; that as a scientist you must ignore them; but that, perhaps as an individual, if you keep them scrupulously out of the laboratory and notebook, you can take your chances on asserting and defending them. On the whole, however, one gathers that the chances are against you if you do. Somehow you are suspected of violating the professional code.

Actually, the number of men of science who have been active in public life is small. The number of poets, soldiers, literary men, and even classical scholars, not to mention historians, seems to be much greater. If one bars physicians and engineers who are trained in applied science, the number sinks to very small proportions indeed. King Charles the Second under whom the Royal Society was founded, had really good scientific talent. But he was too busy with his mistresses and other hangers-on to do much about it. I recall no subsequent monarch and no British premier whatsoever that could be called scientific by any stretch of the imagination.

Thomas Jefferson knew something of scientific discipline, and so did the mathematician Garfield. So far as I know, science has been a closed book to the rest of our Presidents except for the natural history of Theodore

Roosevelt and the technology of Herbert Hoover. While we shall not acknowledge it in Hoover's case until the mists of current, bitter partisanship have cleared away in the winds of Time, I think it will be the verdict of history that the nation has received rich returns from whatever these two men had of scientific understanding. Theodore Roosevelt, admitting his faults, forced us to awaken from the fool's dream that our finite resources were infinite. Herbert Hoover may lack some of the arts of practical politics but he inaugurated a scientific approach to the trends of American society, upon which his successor has built. Moreover this successor, Franklin Roosevelt, has expanded the application of science in national affairs enormously. His secretary of Agriculture is a man trained in the laboratory and field. In assessing the results of Mr. Wallace's labors, we must bear in mind that he is subjected to enormous, often conflicting pressures. Like any practical politician, it has been his task to salvage what good he could in spite of such pressures. To him, as to Mr. Hoover, I believe history will be kinder than his contemporaries have been.

As an epitome of what science can do when harnessed systematically in the public service, I commend to you a reading of the great volume on Soil Conservation just written by Dr. Hugh H. Bennett. I believe that this affords a fairer basis of judging the influence of the present secretary of agriculture than the more partisan discussions of his policies in the vexed fields of farm economics.

Looking back over the history of the modern world, it seems to me that there are two outstanding instances of scientific men in public service. Isaac Newton and Benjamin Franklin were not in many respects alike, a circumstance which makes the study of their public life all the more valuable. I have referred earlier to their profound effect on the shaping of American institutions.

Newton is the scientist's dream of a scientist—a man who loved the quiet of his laboratory and study. When elected a Fellow of the Royal Society in 1672 he wrote, "I shall endeavour to show my gratitude by communicating what my poor and solitary endeavours can effect towards the promoting of philosophic design". Again, speaking of the controversy over his paper on optics, he said, "I was so persecuted with discussions arising out of my theory of light that I blamed my own imprudence for parting with so substantial a blessing as my quiet to run after a shadow". In 1687, following a dispute with Hooke regarding the laws of celestial motions he offers this: "The third (book) I now design to suppress. Philosophy is such an impertinently litigious lady that a man had as good as be engaged in law suits as to have to do with her".

Yet it is recorded, whether truly or not, that Newton began to excel in his school work as a boy only after he had won a fist-fight. And in his quiet way he remained a fighter. In 1687 he led the resistance at Cambridge to royal interference, for which he was reprimanded by the king. But by grateful Cambridge he was later elected to Parliament, where he sat in silence, yet exerted an imponderable influence by his presence and his integrity.

In 1695 he was appointed to the mint, of which he presently became master. To this task he gave himself wholly, serving his troubled nation superbly until his death. One must recall that England was entering upon the era of modern commerce with fiscal machinery that creaked. Newton was far more than an expert supervisor of the stamping of metal.

Franklin's whole temperament was more robust. His genius was eclectic. He has been called both the first American and the first modern. Constantly active in civic affairs, the quality of his scientific work never suffered in consequence. Nor did it suffer from the fact that he was ever conscious of the practical applications of what he did. I doubt if Newton was so greatly concerned about this at all times.

The chief lesson from the lives of these two great men can be stated briefly enough. It never occurred to either one to abandon his moral responsibility. Each knew well enough that his own wishes and preferences had nothing to do with the outcome of an experiment. But each knew also that his personal decisions and actions had a great deal to do with the lives of his fellow men. And the peculiar service of each was based upon his own individual characteristics and abilities. The scientist of today can perhaps simplify his own problem if he bears in mind that he, too, is an individual. His duty to the community is not a stereotyped matter, but one which varies enormously with his own personal qualities. In the field of applied science, our brethren the physicians are now undergoing an ordeal. In an earlier and simpler day they had attempted to prescribe rather rigidly their relation to the public. Yet if a young Syrian physician, Dr. Shadid, in Elk City, Oklahoma, had not revolted against this rigid pattern for his profession, hundreds of farm families in his region would still lack the kind of medical service he has given them. I know this is a sore topic. But I am glad to record that the medical profession is showing signs of awakening to its responsibility, as it has at many crises in the past.

Indeed, I believe that the whole brotherhood of scientific men is actually far more generous towards the efforts of individual scientists to use their varied gifts than most of us know. Take, for example, those who popularize science. Are they ostracised, or even frowned upon by their professional colleagues? Not, I believe, if they are scrupulous in their translation from the symbolic language of science to the idiom of the common man. Perhaps the dangers here are two. One must be a master of the use of words to explain his own field properly to the common man. Not all of us have this mastery. Moreover, one must often discuss matters in fields other than his own. Here unusual care is necessary. I have heard scientific men roundly criticized for discussing religion. But on investigation, one finds them illiterate in the field of religious scholarship. Not their efforts to popularize, but their understanding is at fault. The reading public of laymen does not consist of fools. On the other hand, I have recently seen the words of religious consolation offered to a grieving parent by one of the great biologists of the world. They would stand the most severe scrutiny of scientist or layman, cleric or skeptic. For they are profoundly honest.

Actually, the stage has never been better set than it is today for the man of science to render what public service he can. In some respects our British cousins have paved the way by rewriting the history of science. Levy, Crowther, Hogben, Huxley, and their colleagues have pretty well demonstrated that science has always derived its vitality, not solely from the isolation of the study, but largely from the busy world of practical affairs. The troubled state of modern Europe has driven many of them farther to the left than we care to go in the United States. But the important fact is that they all are moved by an intense passion for social justice. This they express in action without, so far as I am aware, prejudice to the quality of their professional findings. In their organizations they are explicitly and forcefully insistent that the application of science is a moral issue which cannot be left to chance.

Whatever individual services we may render, I am inclined to think that we too have an opportunity to work through our organizations. The National Academy of Sciences and its foster child the National Research Council are already committed to the public service, and function amazingly well. The present leadership of the AAAS is acutely conscious of its social responsibilities. To you I would commend a study and support of these new trends.

But even more important, let me urge you, in your local and state organizations, to be alive to the problems of your immediate communities. You are aware of the apathy towards state academies. You know that, particularly in the Midwest, the state universities and their laboratories are often regarded as a costly excrescence, redeemable only by a good football season. These laboratories must come to be felt by the people to be an integral part of their common life. It is your job to see that the mature life of science follows the pattern of its birth by sharing the problems of mankind. In particular is it your duty to help in the stupendous task of bridging the gap between the social and natural sciences. For make no mistake about it, the social sciences are here to stay, and they need your help.

You need not take to the soap-box. But you can see to it that the man who does is not allowed to pervert the truth.

* * *

Omega on the Air

ELAINE WALKER, President, Omega Chapter

As has already been announced, Omega chapter is experimenting this year with a new project—that of sponsoring a regular radio broadcast of scientific interest. We began by giving one program each month throughout the fall semester, but because of growing interest and available material we have increased this until at present we are presenting one program every two weeks. Our tentative schedule for this semester is as follows:

Feb. 13—A recent field trip through Western Oklahoma. Dr. A. O. Weese, Professor of Zoology.

Feb. 27—The habits and value of toads in Oklahoma. Dr. A. N. Bragg, Instructor in Zoology.

Mar. 12—The purpose and work of the Oklahoma Academy of Science. Dr. G. L. Cross, Head of the Dept. of Botany, and President of the Academy.

Mar. 26—Presentation of spring pledges; The meaning of Phi Sigma to students and to the University.

April 9—Topic to be announced. Dr. A. Richards, Head of the Dept. of Zoology.

April 23—Oklahoma Fossils. Dr. Charles E. Decker, Professor of Paleontology.

May 7—Review of the spring meeting of the Oklahoma Academy of Science, held May 3 and 4 at Lake Spavinaw.

May 21—The year in review. Elaine Walker, President of Omega Chapter, 1939-40.

Since this our first attempt at a program of this type and since it is more or less difficult to see any actual results, we have been simply feeling our way thus far. However, we feel that there is a definite need for radio programs of scientific nature that will at the same time put the people of the state in closer touch with the University and the work that it is promoting. Perhaps our experience this year will open the way for greater programs in the future that will be of definite benefit to the general public and a credit to Phi Sigma.

▽ ▽ ▽

Phi Sigma's

Ten Thousandth Member

The ten thousandth member of Phi Sigma was initiated into Alpha Kappa on January nineteenth. It was Miss Ruth Kearns of Brooklyn, graduate student of Hunter College. On the list of names submitted to the National Secretary's office for engrossing the certificates, hers was the good fortune to be the ten thousandth.

As had been agreed on at the Denver meeting of the Council last Fall, Miss Kearns was therefore invited to attend the National Meeting in Columbus, Ohio and to be present at the Silver Anniversary Banquet.

Ruth Kearns

The Green Folk

A Biological Fantasy

By Carl D. LaRue

One boiling January afternoon I found the following document tucked away in the files of the old Livraria Bittencourt in Pará. A thick layer of mold clothed its cover but mold grows rapidly in the rainy tropics and nothing could be found to indicate the real age of the work. Neither could anything be learned of the writer Joao Fejoa. No one knew whether such a man had ever lived. The mystery is the more profound because one cannot imagine why this amazing revelation has not come to light before this time. From the Portuguese of the account I have made a translation into English which I shall now read to you, apparently the first persons to learn of this incredible adventure save a few friends of the author mentioned in the foreword.

The Green Folk

By Joao Fejoa

Foreword

Many years ago I left my peaceful life as Professor of Logic in the Seminary at Recife intending to spend a short vacation among the splendors of Rio de Janeiro. I sailed on the vessel Indio do Brasil expecting to reach the capitol after a few days' quiet passage but alas! I was destined neither to see Rio nor ever to return to my almost monastic life at the Seminary again. After a few days of meditation on the deck of the stately vessel, sitting as was my habit with knees together, my arms at my sides, the tips of my fingers pressed together, musing, like the triple image of the wise monkeys fused into one, but like one well versed in the writings of the ancients who knew so much of life, seeing all; smiles, side glances, flirtations incident to a sea voyage; hearing all the frothy conversation, platitudes, boasting, and as much smoking-room conversation as my ears could catch without unbending from the dignity of my profession, a furious storm arose which drove our ship helplessly before it for days. No landsman could possibly describe the progress of the tempest so I spare the effort. Finally with a great crash our ship struck a hidden reef and careened violently throwing me overboard in an instant and with me the bench on which I had sat so long. When I rose from the depths I saw the bench floating before me and seized upon it. No sign of the vessel or any of the humans who had embarked on it so gaily a few days before was ever seen again. A heavy rain closed the horizon around me. I stretched myself on the bench and like a good Brazilian fell asleep.

Hours later I was awakened by a bright sun shining in my face, and found the bench resting on the sand of a quiet beach just at the water's edge. From that moment my life was stranger than anything I had ever dreamed. I recount it here with little hope it will be believed. A few friends who have taken pity on an addle-pated old man have read this account and tried to pretend belief. Some have even criticized it, especially one with some pretension to being a naturalist who inquired why I omitted all reference to the love habits and sexual reproduction of the strange beings among whom I had lived. He regarded it as a serious omission in a treatise otherwise detailed and apparently scientific. I was forced to explain that I knew nothing of such matters due to my life in the Seminary. For the protection of the young women entrusted to our care the faculty were forced to eat the fruit of a certain wild tree obtained from the Indians of the Interiór, which had the effect of destroying even all curiosity in regard to sex. A few biologists, apparently because of strong predilections in that direction, maintained a scientific interest in the question, but function, it was believed, was destroyed in all.

When I awoke I found myself on a narrow beach bordered with coconut palms and my first concern was to look for the coconuts which I found lying around their bases. From immature ones I secured a palatable drink and the meat of the ripe nuts satisfied my hunger. Having breakfasted, I returned to the water's edge to see if anything useable from the ship had been cast up by the sea. While there I found nothing, but was astounded and delighted to hear a voice speaking in quaint but understandable Portuguese. It seemed to be that of a mother who was delivering a veritable tirade against an unseen little Joao who was, it seemed, in danger of getting his feet dry. At first I could not discover the source of the voice nor could I imagine the danger so vigorously warned against. However, I soon found that the sounds came from the water and heard a hearty smack (apparently used as a mnemonic device), followed by a wail. As I waded into the sea I saw a shape like that of a small boy scuttling for safety among a mass of floating sea-weed. Then I saw the mother floating in the water like a figure cast in antique bronze, green from head to foot. From shoulder to wrist and from thigh to ankle long graceful bannerets of diaphanous green substance draped themselves in the water. At first I thought this a beautiful costume but later I found that it was *not* a costume. Her hair was green also and of extraordinary length, floating out from her head for some twelve to fifteen feet in a green shimmering cloud. As she lay at ease in the water, the most graceful human (if human), I had ever seen, she saw my shadow on the water and looked up. Quite without fear or self-consciousness she called out "Bom dia!" ("Good morning"). I returned her morning greeting, and she stared at me as curiously as I at her, or rather more so since I was somewhat embarrassed because it had not hitherto been my custom to converse with green ladies of such graceful and apparent proportions. She gave a little giggle and said, "But you are pink like a little crab," and I realized that the morning sun had not improved my complexion.

I shall not weary you with our conversation, especially since her speech was in a dialect difficult to reduce to script and more than a little difficult to understand. When I asked her where she lived she said quite simply, "This is my home". A splash behind me and a jeering call "Red Crab!" "Red Crab" in a small-boy voice assured me I was really dealing with the genus Homo, however strange its environment. Suddenly with loud cries both these creatures cut through the water with incredible speed and disappeared among the kelp. I saw the fin of a shark appear at a little distance and sensed the danger of this home, if home it were. I saw no more of the creatures that day.

But the next morning when I went down to the beach for a swim I saw a group of some dozen men, women and children swimming about in the waves. They surrounded me in the water and asked me all sorts of questions, many of which I could not understand. But I gradually became accustomed to their jargon and on that and succeeding days held fascinating conversations with them in which I learned of their strange mode of living, and in turn astonished them by telling them the simplest facts about my own. They asked me to join them but I explained my inability to swim so well as they, and also that I had to spend most of my time in finding something to eat. "Food", "eat", "hunger", "thirsty", were all words they could not understand. *I* explained to them and realized that they were filled with disgust at the idea of having to swallow fruits, crabs, and such things as I found to eat. I tried to find what dainty fare they consumed, but they protested they swallowed nothing. They had never eaten anything. I asked one stalwart sea god, for the men were as handsome as the woman I had seen on that first day, what he used his mouth for and he said it was for talking, singing, swearing a little when the crabs pinched them, and, (with a grin at the beautiful woman near him), some other things. Finally I realized that these persons had no need to eat or drink but like the seaweed around them absorbed the water they needed from the sea and secured the minerals they needed from the same source while their green bodies with their bannerets and long green hair were photosynthetic organs. They were literally human plants.

What an ideal life they led, I thought. No work to do, no rent to pay, nothing to do but enjoy life and they did enjoy it. They swam like fish, they sang beautifully and had a good knowledge of music and a keen sense of color and form. Aesthetic enjoyment played a great part in their lives. They did not know their origin, but knew their environment in such great detail as would make the most learned marine zoologist or algalogist appear a mere sophomore. They had an extensive literature which they remembered easily but, for obvious reasons, they had no books.

There were many learned scholars among them who taught their arts and learning to the others. I found their philosophy somewhat elementary and learned that the subject was not popular. Their most recent Professor of Philosophy while deep in his meditations had been caught by a shark.

But I found that life for them was not perfect. They were in danger of being dashed on the rocks in storms; they were harassed by sharks and life's little irritations appeared in the form of clinging barnacles and crabs in their hair.

They could walk but it was too much trouble when they could swim instead, and besides they were soon in danger of getting dry, which finally explained to me why little Johnny whom I met the first day, had to keep his feet wet.

(Here a portion of the manuscript was so discolored with mold as to be undecipherable. Damaged patches occurred at intervals all through the manuscript, which makes the account more fragmentary, in all probability, than it otherwise would have been.)

The land was so heavily wooded as to make progress away from the beach almost impossible. By following the shore I came to a large stream and this I followed, wading in shallow water in some places, over the sandbar, and in some places where the water was swift and deep struggling through the forest. Before long I came upon a sandbar of great size and on it I saw fringing the water's edge what appeared to be a grove of palms. This I soon saw was another colony of the Green Folk.

These were even more strange than those I had seen in the water. Their bodies were more stocky and they lacked any bannerets on arms and legs. But back of the neck of each was set a slender column about the thickness of the upper arm and some six feet long. This I learned was a jointed structure with vertebrae in it, really a branch off the spinal column. On the upper end of this structure was a huge parasol covered with a thin skin like the wing of a bat, and bright green in color. It was supported by a framework of light but exceedingly strong bones, very flexible like whalebone. Obviously these people made their own food and I found they were confined to the sand bars where they could escape the shade of the jungle, and also insert their feet in the water or the soft sand. These feet were of great size with enormously extended toes with webs between which served for the absorption of water and minerals.

The sun and the rain did not disturb these beings but sudden winds which struck them before they could fold their parasols sometimes blew them away into the jungle from which they emerged, if at all, with torn parasols and damaged feet.

During long rainy periods when the sun seldom shone they were often very hungry, and sometimes they perished of starvation. As a protection against this danger they stored up food in the form of fat during the fine seasons and so became exceedingly obese.

At night they wrapped themselves in their parasols and huddled together for warmth, for they knew nothing of fire.

The third colony I visited was of sand-bar dwellers also, but they differed greatly from the creatures I had seen farther down river, for they had no parasols but instead had wings like bats but larger. They, also, were entirely green and during the day spread their wings at right angles to the approaching rays from the sun.

A few days later I encountered still another variation of the plant-bat-humans. I came upon them at night and found them immersed in the water of a shallow lake where they doubtless found the nitrogen and other minerals they needed as well as a supply of water for their tissues. Imagine my surprise when next morning they spread their wings and slowly and clumsily flew away. The shade of the forest did not threaten them for they flapped away to a mass of elevated bare crags where they spent all the hours of sunshine sleeping with their wings outspread.

The last colony of sandbar folk I saw were in some ways like the first for they were limited to their life in the open and near the water. They, also, had parasols but not produced from their shoulders. Instead they had very long tails which they curled up along their backs and out over their heads like the tail of a squirrel. These tails were very wide and at a little distance looked like huge banana leaves.

Some days later on an elevated plateau I came at evening to a village and my heart rose at the hope of living again in a house, crude as these appeared at a distance. But as I came into the village I heard the bleating of many goats, which filled all the crudely thatched huts. Next morning a group of Green Folk appeared, milked the goats, drank the milk, set the goats to graze in the open, and then repaired to the sunny grassy slopes where they spread their parasols. During the day they played interminably at a game which I could not understand, and which I was told was very fascinating and required great powers of memory and imagination. Along with the game they cackled over local gossip, and roared over the story of how "Fringy", whose name came from the tattered edge of her parasol, got into difficulty when the said parasol got entangled in the horns of an obstreperous billy-goat.

These folk wore no clothing but kept warm at night by immersing themselves in the waters of a number of warm springs which must have been low in nitrogen which was supplied by the goat's milk which they drank.

Altogether I saw a good many of this tribe. They seemed excessively fond of ornament and frequently wove fringes and lace edges on their parasols. Some of them punched holes in the skin of their parasol-like photosynthetic structures and embroidered the holes. It seemed not to matter to them if their ornamentation were disadvantageous or even dangerous to them so long as they liked their appearance. Some tatooed their bodies and parasols in beautiful designs and colors, but the more chic merely painted on the designs so as to keep up with the constantly changing styles. Ultimately I discovered this tribe was made up exclusively of females.

Higher up in the hills I discovered another tribe of goat-keepers but these never milked their goats and like all the Green Folk, except the other tribe of *Goat-keepers*, ate nothing. They kept the goats merely as a source of nitrogen which they absorbed by standing in the manure of the goatyards during the frequent rains. This colony was made up only of males.

In the bed of a placid river a few miles distant I found a colony which had solved the problem of getting out of the shade and into the sun in a curious way. From their bellies grows a sort of long umbilical cord, one end of which is branched into a fine network which they bury in the mud or sand where it serves both for anchorage and absorption. By some means which I did not learn they expand themselves until their bellies form huge balloons which are green and thus expose a great surface of chlorophyll to the sun when they rise and float above the trees. They float thus in the air like small dolls on huge featherbeds living an easy life except that at times groups of frolicksome monkeys climb up their anchoring cords and slide down, tickling distractingly. When they deflate themselves their erstwhile balloons fall about them in ugly folds, making them in their deflation resemble so many badly defeated political candidates.

The most interesting of all the Green Folk I found in a very fertile open valley where the soil was loose and friable. Through this ran a large river and along its shores a large colony was planted. These people had their feet rooted in the soil and their toes branched out and spread like roots through the ground. Not only this but new individuals were formed as shoots from these root-like structures. Thus the colony was constantly growing.

I saw several such colonies and all were much alike although the individuals showed considerable variation. These folk were very tall with long strong necks and spreading parasols on tall shafts which grew up from the tops of their heads. Their bodies were cylindrical with the legs often grown together into a single trunk-like structure. In youth many of the bodies were like green bronze, satiny and smooth; very slender and beautiful. In age they became stocky and their surfaces furrowed and scaly, oftimes flecked and spotted with mosses and lichens.

In the center of each colony there is always a single individual taller than all the others with an enormous parasol which overshadows the others and cuts off much of the light from them. This leader is called the Big Shoot. Around him stands a ring of individuals less tall than he but overshadowing the others of the colony. These seem to resemble the Big Shoot of their colony as much as possible and are called "The Greens". In another ring outside the Greens are a rather motley group somewhat pale and anemic looking, with disproportionately large heads and not very large parasols. Some are gnarled and stooped. Most of them appear rusty and are heavily coated with lichens. They are overshadowed by the "Greens" and also by the remaining members of the colony outside them. For some reason their *sheltered* position, shall we say, is supposed to be enviable. These are called "The Reachers", perhaps because they are always reaching for light they do not get.

I learned much of the curious customs of these "Green Trees". One I could not understand. Occasionally a little shoot would appear which, just as in some plants, developed anthocyanin and became red instead of green. These "Reds" as they were called were regarded with fear and loathing and were at once deeply shaded by the parasols of the surrounding group. If they lost their anthocyanin and turned green they were given light, otherwise they were shaded until they died. The only explanation I could get of this treatment of the anthocyanin-containing shoots was that they grew up into individuals neither handsome, nor pleasant to have around.

Occasionally the river would cut into the land and wash out some of the outer members of the colony. Though they knew they were likely to be carried down to a rich alluvial flat where they could develop colonies of their own and become "Big Shoots" they always assumed an air of sadness on departure. The formula which each would repeat was as follows: "It is with deep regret that I leave you, My Brethren, but I am called to fields of greater service".

I visited a number of these colonies and studied their organization. These folk have a great body of lore and literature which is stored in the large heads of the "Reachers" who however speak only in low tones so that they are heard only by the "Greens" and the "Big Shoot". The "Big Shoot" lectures to his colony in a loud voice and with great authority, stopping occasionally for prompting from the "Greens" who in turn catch the words from the "Reachers". These talks of the leader may go on for long periods and I was surprised at the endurance of these "Big Shoots".

The function of the "Greens" as I have shown was to relay information from the shabby "Reachers" to the "Big Shoots" and I could never note that they added anything of their own. But they had another function which was to replace the "Big Shoot" when for any reason he died. When he had fallen from his place each of the "Greens" would begin to stretch out his neck and seek to elevate his parasol into the vacant space. In this way they would all increase their stature considerably and each would assume an air of great importance like a dean of a university striving to be the apparently logical recipient of the cloak of a defunct president. Ultimately one would overtop the others who would then draw back into their former places and shrink down to their former statures trying to pretend they had never aspired to great place.

The one who has thus elevated himself to the post of "Big Shoot" undergoes a great transformation. His parasol enlarges and his neck lengthens enormously. His head swells greatly; becomes hollowed out and indurated to form a great sounding box which opens to the world through a huge mouth. Apparently he is required immediately to forget his former lowly position.

Some of these leaders were of truly noble stature, often with furrowed and fissured *bark*, we might call it, but producing speeches of great beauty and wisdom. Others had a handsome exterior; one I saw was black above with a trunk below covered with narrow vertical gray stripes, the whole giving an effect of our familiar cutaway coat and striped trousers. Some had very loud voices uttering incessantly in a pompous manner speeches most inane. Inside, I learned, they were full of dry rot, and their surfaces were of incredible slipperiness.

Among these folk I observed a phenomenon which I was unable to explain; possibly it was due to environment, but I am sure as to the fact. Among all the ranks of the colony I saw certain individuals of which one side was entirely different from the other. This could not have been due to grafting of two individuals for grafting does not occur among them at all.

At morning and evening these colonies held services of great beauty and solemnity. All the members have fine voices which resound for a long distance. The "Big Shoot" serves as a soloist chanting powerfully and melodiously, phrases and sentences broken by pauses after each of which the other members of the colony, each in his most effective register, sing a refrain of "Yes", "Yes", "Yes".

These services always filled me with an unutterable sorrow because they so strongly reminded me of meetings on the campus of my own beloved seminary, to me forever lost.

▽ ▽ ▽

The Beta Scholarship

Beta wishes to remind Biologist readers of the Phi Sigma Loan Fund set up by the Ann Arbor chapter in 1936 to aid students who wish to attend the University of Michigan Biological Station at Douglas Lake. The fund of $100.00 is available, in whole or in part, to student biologists not only from Michigan but from other campuses, whether or not they are mmbers of Phi Sigma. Application or inquiries for further information should be addressed to the University of Michigan Committee on Student Loans.

Report of the National Council Meeting

December 28, 1939

1. National Council announced that Dr. Leon C. Cole was elected Honorary National President by chapter vote following National Council recommendation.

2. National Council recommended General Academic Assessment be supended until next National Meeting.

3. National Council recommended rewording Article III, Section 8: There is no fee for installation of a petitioning group. Each charter member shall pay the regular initiation fee of $5.00. If there are fewer than twenty charter members, the total fee sent to the National Treasurer must be $100.00, but the local chapter treasury may retain subsequent initiation fees until a total of twenty members has been initiated.

4. National Council moved that the National Secretary annually inform the President of each institution where there is an active chapter of Phi Sigma, of the procedure of awarding a scholarship medal for excellence in biology; that the medal be sent to the President with the request that it be awarded *publicly* along with other honors, awards, and recognitions.

5. National Council voted to withdraw recommendation No. 8 of Denver Council report.

6. National Council voted to withdraw Section No. 17 of Denver Council report and substitute the following as an amendment. Article IV, Section 2, sentence 1, to read—(bold face)— *research promise*—delete—(bold face)— "specific ability for research work".

National Meeting,
Friday, December 29, 1939

Chancellor Paul A. Warren called meeting to order at 8:40 A.M. Reported a quorum of sixteen delegates. Those present during the morning were: Beta, Zeta, Eta, Iota, Kappa, Lambda, Mu, Pi, Rho, Tau, Sigma, Chi, Psi, Alpha Alpha, Alpha Beta, Alpha Epsilon, Alpha Eta, Alpha Theta, Alpha Iota, Alpha Kappa, Alpha Lambda, Alpha Nu.

Introduction of delegates and National Council members was followed by announcements.

National Secretary made report of National Council meeting of preceding day. Moved by Eta to accept report; seconded by Alpha Theta. Carried.

Chancellor Warren appointed the following committees:

Auditing Committee—Chairman, P. C. Walker, Alpha Epsilon; R. C. Snyder, Alpha Iota; W. W. Cormack, Epsilon.

Resolutions Committee — Chairman, K. F. Lagler, Beta; Joe Goodman, Psi; R. Elaine Walker, Omega.

Nominations for Vice Chancellor were called for from the floor. Alpha

Nu nominated Dr. M. H. Hatch, and Lambda, Dr. Fred A. Barkley. For Secretary, Kappa nominated Dr. A. I. Ortenburger. Discussion by Iota, Zeta. Zeta moved that Chancellor Warren appoint a nominating committee to consider nominations Saturday morning; seconded by Alpha Eta. Carried. Committee appointed: Chairman, Zeta; Lambda, Alpha Nu.

9:15—new business.

No. 1—Mu moved that matter of suspension of General Academic Assessment be considered together with lowering initiation fee to National Chapter; seconded by Kappa. Discussion by Alpha Nu, Mu, Iota, Eta, Rho, Stewart, Mu, Kappa, Phi.

No. 2—Rho moved that General Academic Assessment be suspended until next National Meeting; Zeta seconded.

No. 3—Mu moved rewording of Article III, Section 8, as proposed by National Council be adopted; Eta seconded.

No. 4—Zeta moved that wording of recommendation No. 7 of National Council, page 12, Biologist, October, 1939, be adopted; Phi seconded.

No. 5—Rho moved that item No. 8 of Denver Report of National Council be rejected; Alpha Theta seconded.

No. 6—Alpha Nu moved that No. 17 of the same recommendation be rejected; Beta seconded.

No. 7—Kappa moved that words, "Research promise", be substituted for bold-face type in Article IV, Section 2 of Constitution; Lambda seconded.

Mu moved that a special membership be created which does not involve a subscription to the Biologist; not seconded.

No. 8—Mu moved that initiation fee be reduced from $8.00 to $2.50; Iota seconded.

No. 9—Mu moved that National Meeting be held every three years instead of every two years; Iota seconded. Discussion by Eta.

Announcements made by Chancellor Warren.

Meeting adjourned at 10:07 A.M.

Saturday, December 30, 1939

Chancellor Warren called meeting to order at 8:15 A.M. Twenty-one delegates were present: Beta, Mu, Nu, Pi, Rho, Tau, Sigma, Epsilon, Phi, Chi, Psi, Omega, Alpha Alpha, Alpha Eta, Alpha Theta, Alpha Iota, Alpha Kappa, Alpha Lambda, Alpha Mu, Alpha Kappa, Alpha Omicron.

Motions of last business meeting considered first.

Motion No. 1 (see above) discussed by Mu, Iota, Psi. Motion lost.

Motion No. 2 discussed by Iota, Mu, Keefe, Beta, Stewart, Keefe, Beta. Motioned carried.

Motion No. 3 carried without discussion.

Motion No. 4 discussed by Ortenburger, Mu, Upsilon, Zeta, Rho, Chi, Mu, Eta, Stewart, Zeta, Mu, Alpha Eta, Alpha Kappa, Beta, Zeta, Alpha Lambda, Zeta, Omega, Lambda, Psi, Alpha Alpha. Motion lost 17 to 10. Vote: Those voting against were Beta, Iota, Mu, Upsilon, Phi, Alpha Alpha, Alpha Beta, Alpha Theta, Alpha Mu, Alpha Omicron. Those voting for: Zeta, Eta, Kappa, Lambda, Nu, Rho, Tau, Sigma, Chi, Psi, Omega, Alpha Eta, Alpha Iota, Alpha Kappa, Alpha Lambda, Alpha Nu, Alpha Xi.

Motion No. 5 carried without discussion.

Motion No. 6 carried without discussion.

Motion No. 7 carried without discussion.

Motion No. 8 lost without discussion.

Motion No. 9 discussed by Mu, Eta, Alpha Nu, Mu, Alpha Alpha, Rho, Beta, Eta, Mu, Alpha Alpha, Alpha Nu, Omega, Zeta, Mu, Alpha Nu. Motion lost.

New business.

Zeta moved that By-laws Section 1a be amended by deletion of everything after semicolon; i.e. "but an initiate not purchasing a Key shall contribute the sum of One Dollar to the National Treasury for the Endowment Fund". Beta seconded. Motion carried.

Mu moved that the rewording suggested by National Council for first part of By-laws, Section 1a be approved. Those voting against were Beta, Epsilon, Sigma, Upsilon, Phi, Chi, Alpha Alpha, Alpha Beta, Alpha Eta, Alpha Theta, Alpha Iota, Alpha Kappa, Alpha Lambda, Alpha Mu, Alpha Nu, Alpha Xi, Alpha Omicron. Those voting for were Zeta, Eta, Iota, Kappa, Lambda, Mu, Nu, Rho, Tau, Psi, Omega. Motion lost 11 to 17.

A—9:50 A.M. Kappa moved that some provision be made to send a delegate to investigate inactive chapters at national expense; seconded by Alpha Alpha.

Chi discussed the idea of making a movie film showing chapter activities. Further discussion by Beta, Psi, Epsilon, Omega, Kappa.

B—Kappa moved that a committee be appointed to investigate cost of above suggestion for the making of a movie film to be composed of local shots. Tau seconded.

C—Beta moved that a committee be appointed to investigate, study, and formulate a plan for the complete reorganization and renovation of the Biologist; Mu seconded. Discussion by Kappa, Beta.

(10:00) Motion by Mu to adjourn was lost. Chancellor Warren declared a recess.

(10:15) Meeting again called to order.

Nu suggested a consideration of situation at Mu. Discussion by Stewart, Beta, Omega, Rho, Alpha Mu, Alpha Epsilon, Omega, Beta, Eta, Alpha Theta, Alpha Omicron.

Chairman Frey, Zeta, reported for the Nominating Committee as follows:

For Vice-Chancellor: Dr. M. H. Hatch, Dr. W. B. Herms, Dr. F. A. Barkley.

For Secretary: Dr. A. I. Ortenburger.

Nominations from the floor were again called for by the Chancellor. There were none.

Meeting was adjourned 10:45.

Saturday, December 30, 1939.

Chancellor Warren called meeting to order at 1:02 P.M.

Report on item No. 12 requested by the National Council in its Denver report given by Alpha Kappa. Discussion by Kappa, Beta.

D—Joint motion was made by Beta, Mu, Iota, Alpha Alpha that advertising for the *Biologist* be turned over to a top-ranking metropolitan advertising agency whose task it then becomes to secure advertising necessary to put the *Biologist* on a self-sustaining basis; Psi seconded. Discussion by Kappa, Alpha Kappa, Keefe (at length), Ortenburger, Beta (at length), Kappa.

Motion C of preceding session was discussed and carried.

The Chair formally appointed as a committee delegates from Beta, Mu, Iota, and Alpha Alpha as this group had already discussed this subject. The recommendations of this committee were:

1. Editorial staff should consist of: a. Editor-in-Chief, Dr. A. M. Keefe; b. Feature Editor; c. Chapter Letter Editor; d. Employment Service Editor; e. Consulting Editor in special fields, particularly in regard to book reviews; f. Alumni Editor.

2. That heads of all departments of biology where chapter are located be sent individual copies of the *Biologist* by mail.

3. Inside of front and back covers are to be sold for advertising.

4. Chapter directory on one page only.

5. There should be judicious editing, cutting, and selecting of chapter letters.

6. The advertising agency be directed to solicit the publishing houses of all books which have been reviewed.

7. It is suggested that the Biologist be published twice a year and that it be photolithed.

Discussion by Psi, Mu, Stewart. This committee is to be a continuing committee and will report to National Council.

Kappa moved the above report be accepted; Eta seconded. Discussion by Kappa, Alpha Alpha, Psi, Lambda, Alpha Omicron, Mu, Eta, Kappa, Mu, Kappa, Keefe. Carried.

(2:30) Mu reported for the committee fostering new chapters of the Society. Psi moved that report be accepted; Alpha Lambda seconded. Discussion by Mu, Psi, Lambda, Zeta, Mu. Carried.

Rho moved Alpha Kappa be continued as Committee on Advertising; Omega seconded. Discussion by Alpha Kappa. Motion carried.

Tau reported on item No. 11, October, 1939, *Biologist*, page 12. Beta moved report be accepted and committee be discontinued; Alpha Alpha seconded. Carried.

Alpha Mu reported on item No. 14, *Biologist*, October, 1939, page 12. Eta moved that report be accepted and committee be discontinued; Zeta seconded. Discussion by Alpha Theta. Motion carried.

Reports under item No. 10, page 12, *Biologist*, October, 1939, concerning inactive chapters:

Alpha Epsilon reported on Alpha. Omega moved report be accepted and Alpha Epsilon be continued as committee; Epsilon seconded. Carried.

Phi reported on Delta. Rho moved to accept report and continue Phi as committee; Eta seconded. Carried.

Beta reported on Theta. Zeta moved to accept report and continue Beta as committee; Kappa seconded. Carried.

Kappa reported on Xi. Iota moved to accept report and continue Kappa as committee; Mu seconded. Carried.

Zeta reported on Omicron. Lambda moved to accept report; Iota seconded. Carried.

Zeta moved that no attempt be made to reestablish chapter at University at North Dakota; Eta seconded. Carried.

Rho reported on Alpha Gamma. Omega moved to accept report and continue Rho as committee; Upsilon seconded. Carried.

Alpha Omicron reported on Alpha Delta. Kappa moved that report be accepted and committee be discontinued; Epsilon seconded. Carried.

Auditing Committee reported that

the books were found in order, and that they had been examined and approved by a Certified Public Accountant. Rho moved that the report be accepted; Lambda seconded. Carried.

Resolutions Committee reported as follows:

On this, the Silver Anniversary Convention of Phi Sigma Society: Be it resolved that a vote of thanks be tendered the local committee of the A. A. A. S. in charge of the Columbus meeting through a letter from the National Secretary of Phi Sigma Society.

Be it resolved that the present active members of the National Council, as well as all previous members, know that they have sincere gratitude of the Society for their splendid guidance and development of this organization.

Be it resolved that the faithful Editor of the Biologist be especially lauded and that greater cooperation be pledged his continued and unselfish effort.

Be it resolved that the Secretary be instructed to publicize the Silver Anniversary of Phi Sigma in *Science*, and similar organs by whatever means he sees fit.

Signed this 30th day of
December, 1939, A.D.
Joe Goodman
R. Elaine Walker
Karl F. Lagler, Chairman

Kappa moved that the report be accepted; Alpha Epsilon seconded. Carried.

Mu moved that National Council consider the feasibility of publishing list of active members in next *Biologist* and subsequently publishing list of new members initiated each year; Alpha Theta seconded. Discussion by Alpha Alpha, Zeta, Ortenburger, Alpha Nu, Mu, Beta. Carried.

(3:50 P.M.) Kappa withdrew motion A of Saturday morning.

Motion B of Saturday morning carried. Chair appointed: Chairman, Chi, Omega, Psi.

Motion C withdrawn.

Motion D carried.

Zeta moved that a unanimous ballot be cast for Dr. A. I. Ortenburger for National Secretary; Psi seconded. Carried unanimously.

Beta moved to recommend to National Council that at least $450 annually be provided for the office of the National Secretary; Kappa seconded. Carried.

Kappa moved to recommend to National Council to allow Dr. A. M. Keefe certain monies toward expenses for work of editorial staff and preparation of membership list; Upsilon seconded. Discussion by Zeta. Carried.

(4:20) Nominees for Vice-Chancellor were discussed by Lambda, Zeta, Mu, Beta. Dr. Fred A. Barkley elected.

Meeting was adjourned at 4:30.

* * *

Honorary Members

With Past and Present National Officers

Allen, Dr. Bennet, Alpha Alpha, 909 Micheltorena St., Los Angeles, Calif.

Amesse, Dr. John William, Epsilon No. 14, 624 Metropolitan Bldg., Denver, Colo.

Avinoff, Dr. Andrey, Alpha Epsilon No. 50, Carnegie Museum, Pittsburgh, Pa.

Barkley, Fred A., (N.O.), Omega '28, University of Montana, Missoula, Montana.

Bateman, Dr. William George, Lambda No. 71, 630 University Ave., Missoula, Montana.

Birge, Dr. Edward Asahel, Zeta No. 132, University of Wisconsin, Zool. Dept., Madison, Wis.

Blake, Abigail Kincaid, Delta No. 43, University of Nebraska, Lincoln, Nebraska.

Boyd, David Hartin, Nu No. 28, Perrysville Ave., Pittsburgh, Pa.

Brannon, Dr. Melvin Amos, Lambda No. 67, University of Wis., Botany Dept., Madison, Wis.

Brink, Dr. Royal Alexander, Zeta No. 533, University of Wis., Botany Dept., Madison, Wis.

Bryan, Dr. George Smith, Zeta No. 116, 2122 Chadbourne, Madison, Wis.

Carlson, Dr. A. J., Omega No. 54, University of Chicago, Physiology Dept., Chicago, Ill.

Case, Dr. Ermine Cowles, Beta No. 119, 619 E. University Ave., Ann Arbor, Michigan.

Cody, Prof. Madison Derrel, Sigma No. 14, University of Florida, Botany Dept., Gainesville, Florida.

Cogan, Dr. S. Eric, (N.O.), Alpha '25, Ashland Daily Independent, Ashland, Ky.

Cole, Dr. L. J., (N.O.), Zeta No. 255, University of Wisconsin, Genetics, Madison, Wis.

Cook, Harold James, Epsilon No. 120, Agate, Nebraska.

Cook, Dr. William C., Chi No. 30, U. S. Dept. of Agri., Box 642, Modesto, Calif.

Cox, Dr. H. R., Lambda, U. S. Public Health Service, Hamilton, Montana (in Eng. for year)

Crosby, Elizabeth C., Beta, School of Med., University of Michigan, Ann Arbor, Michigan.

Cummins, Harold, (N.O.), New Orleans, La., Asst. Prof. Anat., Tulane Univ. Med. Sch. Beta.

Curtis, Dr. George Morris, Beta No. 61, Ohio State University, Columbus, Ohio.

Cutler, Ira E., Epsilon '17—deceased.

Daines, Dr. L. L., Alpha Lambda No. 37, 1366 Butler Ave., Salt Lake City, Utah.

Dana, Dr. Samuel Trask, Beta No. 392, University of Michigan, Ann Arbor, Michigan.

Davenport, Gertrude C., Nu No. 34, Cold Spring Harbor, New York.

Davenport, Dr. Charles Benedict, Nu No. 34, Carnegie Institution Washington, Cold Spring Harbor, New York.

Davis, Everett F., (N.O.), Mu '23, 5 Knowles Ave., Kensington, Maryland.

Evermann, Dr. Barton Warren, Mu No. 209—deceased.

Fisher, Dr. Walter Kendrick, Mu No. 111, Hopkins Marine Station, Stanford Univ., Pacific Grove, Calif.

Folsom, Dr. Donald, Delta No. 110, Agri. Exp. Station, Orono, Maine.

Fred, Dr. Edwin Brown, Zeta No. 190, 610 N. Francis St., Madison, Wisc.

Frey, Charles N., (N.O.), Zeta '17, 45 Cambridge Road, Scarsdale, New York.

Garner, Dr. James Bert, Nu No. 72, 54 Lebanon Hills Drive, Mt. Lebanon, Pittsburgh, Pa.

Gilbert, Dr. Edward M., Zeta No. 57, University of Wis., Botany Dept., Madison, Wis.

Glaser, Dr. Otto Charles, Beta No. 41, Amherst College, Amherst, Massachusetts.

Goldschmidt, Dr. Richard B., Omega No. 92, Zool. Dept., Univ. of Calif., Berkeley, Calif.

Gowen, Dr. John, Delta No. 71, Ames, Iowa.

Graham, Dr. Evarts Ambrose, Iota No. 256, Washington Univ., School of Med., St. Louis, Mo.

Gran, Dr. Haaken Hasberg, Psi No. 110, University of Oslo, Oslo, Norway.

Graves, Dr. Arthur Harmount, Nu No. 36, Brooklyn Botanical Garden, Brooklyn, New York.

Guyer, Dr. Michael F., Zeta No. 339, 138 N. Prospect Ave., Madison, Wis., Univ. of Wis.

Harper, Dr. Robert Almer, Alpha Kappa No. 51, Botany Dept., Columbia Univ., New York.

Halverson, Henry M., Delta '24, Yale University, New Haven, Connecticut.

Hart, Prof. Edwin Bret, Zeta No. 508, Chemistry Dept., Univ. of Wis., Madison, Wis.

Hatch, Dr. Melville H., (N.O.), Beta '18, Univ. of Washington, Seattle, Wash.

Holland, Dr. William Jacob, Nu No. 10—deceased.

Henderson, Prof. Louis F., Alpha Mu No. 25, Botany Dept., Univ. of Oregon, Eugene, Oregon.

Hubbel, Theodore Huntington, Sigma No. 15, Zool. Dept., Univ. of Fla., Gainesville, Fla.

Huber, Dr. G. Carl, Beta No. 3313—deceased.

Hunt, Dr. Barbara, Delta No. 73 (Mrs. A. D. Pelletier), 10 Hammond St., Lewiston, Maine.

Huston, Dr. Ralph C., Theta No. 5, Michigan State College, East Lansing, Mich.

Jacobs, Maurice, (N.O.), Delta '17, 7139 Creshein Road, Mt. Airy, Philadelphia, Pa.

Jeancon, Dr. Jean Allard, Epsilon No. 35, 1654 Grant, Denver, Colo.

Jennings, Dr. Otto Emery, Nu No. 12, Carnegie Museum, Pittsburgh, Pa.

Jones, Dr. Lewis Ralph, Zeta No. 55, 1731 Regent St., Madison Wis., Univ. of Wis.

Jordan, Dr. David Starr, Mu No. 115—deceased.

Jordan, Dr. Whitman Howard, Delta No. 36—deceased.

Juday, Dr. Chancey, Zeta No. 544, Univ. of Wis., Madison, Wisconsin.

Kahl, Dr. P. Hugo I., Alpha Epsilon No. 51, 282 Bellefield Ave., Pittsburgh, Pa., Carnegia M.

Kahn, Dr. Reuben L., Beta No. 1122, Michigan Ave., Ann Arbor, Mich.

Keefe, Rev. Anselm M., (N.O.), St. Norbert College, West DePere, Wis.

Kellogg, Clause Rupert, Epsilon No. 19, Fukien Christian Univ., Foochow, China.

Kingsley, Dr. J. Sterling, Mu No. 81—deceased.

Kraus, Dr. Ezra Jacob, Zeta No. 82, Botany Dept., Univ. of Chicago, Chicago, Ill.

Kremers, Dr. Edward, Zeta No. 501, Univ. of Wis., Madison, Wis.

Lepeschkin, Dr. Wladimir, Iota No. 155, Physiological Institute, Univ. of Vienna, Vienna, Austria.

Lichty, Dr. John Alden, Alpha Beta No. 41—deceased.

Linton, Dr. Edwin, Nu No. 13—deceased.

Long, Dr. John D., Nu No. 17, Pan-American Sanitary Bureau, Washington, D. C.

Ludwick, John E., (N.O.), Beta '18, 1010 W. Washington St., Jackson, Michigan.

Lush, Prof. Jay L., (N.O.), Iowa State College, Ames, Iowa.

Macbride, Dr. Thomas Huston, Psi No. 168—deceased.

Mac Dougall, Dr. Mary Stuart, Pi No. 14, Agnes Scott College, Decatur, Georgia.

Mail, George Allen, Chi No. 31, Dominion Entomological Lab., Kamloops, B. C., Canada.

Mathew, Dr. William Diller, Mu—deceased.

Miller, Robert C., (N.O.), Univ. of Washington, Seattle, Washington.

Morse, Warner Jackson, Delta—deceased.

Munkhenk, Dr. Russel, (N.O.), Alpha '15, 303 E. Main St., Barrington, Ill.

Niedrach, Robert James, Epsilon No. 109, 808 S. Gilpin St., Denver, Colo.

Nieuwland, Rev. Julius Arthur, Nu No. 33—deceased.

Noland, Lowell (Prof.) (N.O.), 1732 Summit Ave., Madison, Wis.

Novy, Dr. Frederick George, Beta No. 216, 721 Forest Ave., Ann Arbor, Michigan.

Ortenburger, Dr. Arthur I., (N.O.), Zoology Dept., Univ. of Okla., Norman, Okla.

Ortmann, Dr. Arnold Edward, Nu—deceased.

Owen, Dr. Forest, Zeta No. 125, Office Sugar Beet Investigations, U. S. A., 1810 S. Main St., Salt Lake City, Utah.

Parish, Dr. Samuel Bonsall, Mu No. 203—deceased.

Park, Dr. William Hallock, 333 E. 68th St., New York City.

Parker, Dr. John Robert, Chi No. 29, U. S. Entomological Lab., Bozeman, Montana.

Parker, Dr. Ralph Robinson, Lambda No. 24, U. S. Public Health Service, Hamilton, Mont.

Patch, Dr. Edith, Delta No. 50, P. O. Box 150, Orono, Maine.

Pearse, Dr. Arthur Sperry, Zeta No. 56, Zool. Dept., Duke Univ., Durham, N. C.

Peet, Dr. Max Minor, Beta No. 43, 2030 Hill St., Ann Arbor, Michigan.

Pinchot, Dr. Gifford, Nu No. 20, Milford Pike Co., Milford, Pa.

Reed, Prof. Carlos, (N.O.), Physiology Dept., Univ. of Ill., Med. School, Chicago, Ill.

Reed, Mrs. Madeleine Mogne, Nu '22, Marden St., Washington, Pa.

Richards, Mrs. Mildred Hoge, Omega No. 20, 434 Chautauqua St., Norman, Okla.

Roberts, Dr. Elmer, Rho No. 102, 404 W. Iowa St., Urbana, Ill.

Ruthven, Dr. Alexander G., (N.O.), Beta No. 352, Univ. of Michigan, Ann Arbor, Michigan.

Sax, Karl, Arnold Arboretum, Jamaica Plain, Boston, Mass. (Delta '24)

Sax, Mrs. Karl, Arnold Arboretum, Jamaica Plain, Boston, Mass. (Delta)

Schwitalla, Rev. Alphonse M., Iota, St. Louis Univ., St. Louis, Mo.

Sears, Dr. Paul B., (N.O.), Oberlin College, Oberlin, Ohio.

Sellars, Dr. Roy Wood, Beta No. 40, 1044 Ferdon Road, Ann Arbor, Michigan.

Setchell, William Albert, (N.O.), Univ. of Calif., Berkeley, Calif.

Shull, Dr. A. Franklin, Beta No. 378, 431 Highland Road, Ann Arbor, Michigan.

Sink, Emory Walter (N.O.), 1546 Packard, Ann Arbor, Michigan.

Skogsberg, Dr. Tage, Mu No. 121, Stanford Univ., Pacific Grove, Calif.

Stewart, Erwine H., (N.O.), Mesa, Colorado.

Stone, Dr. Charles, Nu No. 19, 13211 Lake Shore Blvd., Cleveland, Ohio.

Tanner, Dr. Fred Wilbur, Rho No. 29, 803 West Michigan Ave., Urbana, Ill.

Tucker, Dr. David Andrew, Beta No. 62, 3518 Bayard Drive, Cincinnati, Ohio.

Van Cleave, Dr. Harley Jones, Rho No. 30, Zoo. Dept., Univ. of Ill., Urbana, Ill.

Wagner, George, Zeta No. 229, 1901 Jefferson St., Madison, Wis.

Waller, Adolph (N.O.), Ohio State Univ., Columbus, Ohio.

Warren, Paul A. (N.O.), Beta '20, Tufts College, Medford, Mass.

Wenley, Dr. Robert Mark—deceased.

Weyer, Prof. Edward Moffat, Nu No. 21, Explorers Club, New York City.

Whiting, Dr. Anna Rachel, Delta No. 87, Univ. of Pa., Pittsburgh, Pa.

Williams, Prof. Roger, Alpha Mu No. 159, Dept. of Biochemistry, Univ. of Texas, Austin, Texas.

Woodruff, Lorande L., Omega, Yale University, New Haven, Conn.

⁂

Editorials

"After the Ball"

"Many a heart that was broken", so ran the old sentimental ballad. It hardly applies to the unquestionably effective National Meetings which were held on the twenty-fifth anniversary of Phi Sigma's founding, on the very campus where it came into being. Nor does it apply to the anniversary banquet, with the witty toastmastering of our Chancellor, Dr. Warren, the gracious presence of our new National President, Dr. Cole, or the splendid address of our former Chancellor, Dr. Sears.

The entire jubilee celebration will be one to be remembered long by all who were fortunate enough to participate, not the least of whom was the charming 10,000th member of Phi Sigma, Miss Ruth Kearns, of Brooklyn.

Simplicity marked the appointments both for the meeting and the anniversary banquet, a simplicity which was much in keeping with the pressure of business to be transacted, and the feeling which seemed to animate all, that in rounding the first quarter-century post, Phi Sigma had really come of age.

New Editorial Policy

This is the last issue of THE BIOLOGIST to be edited by the sixth member of the National Council alone. From now on he will have help, something which he has long needed, and which he will much appreciate.

In keeping with the new policy of the National Council to let the Chapter Officers and Delegates get a fair-sized sample of the work which has been coming its way for the last fifteen years, the Editor finds it easy to subdivide the responsibilities of his position. Reserving the title of Editor-in-Chief for the Council Member who will hold the responsible position, the following will, immediately upon the publication of this issue take charge of their departments as follows: Special Features: Miss Gertrude Silberman, Alpha Kappa; Other Features: Mr. H. H. Mitchell, Alpha Alpha; Alumni News: Dr. M. H. Hatch, Beta (Psi); Chapter News Letters: Miss Jane C. Dirks, Rho; Advertising: Mr. Karl Lagler, Beta; Employment Department: Mr. Caswall Graves II, Iota; Inter-Chapter Committee Reports: Mr. Robert Ray, Mu.

The April issue of THE BIOLOGIST must go to press no later than April 10th, since some of the Universities close by mid-May. It normally takes four weeks from the date the material goes to the printer, to get the copies into the hands of the Chapter members. This means that each of the Editorial Staff will have his or her material, all neatly typed, of course, in the Editor-in-Chief's hands not later than April 9th.

Wtih the cooperation of all these energetic, and enthusiastic members of the Chapter Delegations to the Silver Anniversary meeting, there can be no question that the Chapters will respond with equal enthusiasm and alacrity to the end that in the new quarter century of its existence, THE BIOLOGIST will become, what this Editor-in-Chief has always wanted it to be, a true mirror of the Society, Phi Sigma as it really is.

It is with unfeigned pleasure that your old Editor presents to you, Chapters of Phi Sigma, your new Editorial Staff, and bespeaks for them your whole-hearted cooperation.

Abstracts

Papers Presented at Columbus Meeting

1. *The Effect of Growth Hormone Injections on the Rat Tibia.* **Robert D. Ray, Herbert M. Evans**, and **Hermann Becks**, Mu Chapter, University of California, Hooper Foundation, Division of Dental Medicine, Medical Center, San Francisco, Calif.

Early in the life of a normal female rat (Between 25 and 50 days of age) there is an equilibrium established between the formation of cartilage and bone in endochondral ossification, an equilibrium which, in the proximal end of the tibia, is maintained until very late in the life of the animal.

Growth hormone injections over a short period (10 days) are followed by definite stimulation of endochondral ossification with little disturbance of this equilibrium in unoperated rats, except in plateaued animals (150 days and older) where there is hypertrophy of the epiphyseal cartilage; injections are also followed by a decrease in the fat content of the marrow.

Hypophysectomy is followed after 25 days not only by (a) disturbance of this equilibrium with a reduction in the width of the epiphyseal cartilage, but also by (b) resorption of the diaphyseal trabeculae, (c) an increase in the fat content of the marrow, and (d) in 150 day old animals, a deposition of bone along the diaphyseal side of the epiphyseal cartilage.

Growth hormone injections over a similar period in hypophysectomized animals (15 days postoperative + 10 daily injections = 25 days) are followed by (a) definite disruption of the equilibrium with increased cartilage formation and a return to the "youthful" type of epiphyseal line, most pronounced in young animals (54 to 88 days of age), (b) increased activity in the diaphysis with the formation of trabeculae and the deposition of bone along them, and (c) stimulation of the myeloid elements of the marrow and a reduction in the number of fat cells.

2. *Physaloptera terrapenis,* a new nematode from a tortoise. **William C. Hill**, Alpha Eta Chapter, Oklahoma A. and M. College.

A previously undescribed "tetradelphous" physalopterid stomach worm was found in 7 box tortoises *Terrapena ornata* (Agassiz) collected in various parts of Oklahoma. The new species differs from its closest relative, *Physaloptera caucasica* von Linstow 1907 (= *P. mordans* Leiper 1908), in having (1) a relatively longer left spicule, (2) papillae of different form and arrangement, (3) a different pattern of cuticular crests and bosses on the bursa of the male, (4) four additional cephalic papillae, (5) peculiar chitinous structures about the mouth, and (6) an American reptilian rather than an Old World mammalian host.

3. *Chorio-allantoic Technique.* **Oliver Roholt**, Lambda Chapter, University of Montana.

The technique of Goodpasture *et al* for chorio-allantoic culture of small pox has been repeated successfully. The technique is being applied to other virus diseases.

4. *Age at Spawning of the Salmon (O. nerka lennerlyi) in Flathead Lake, Montana, with a Correlation of Scale and Otolith Readings.* **George F. Weisel**, Lambda Chapter, University of Montana. (No abstract.)

5. *Anaphylactic Studies.* **Nancy Lennes**, Lambda Chapter, University of Montana. (No abstract.)

6. *The Increase in Time of Development after Partial and Complete Starvation of Larvae and its Effect on the Phenotype of Several Mutants of Drosophila Mel.* (By Title.) **J. Werner Braun**, Mu Chapter, University of California.

Partial (peptone-food) and complete starvation of larvae of *Drosophila mel.* increases the time of development. The developmental rate can be changed differently according to the degree and length of starvation and the stage in development at which it is started. If the time of development is thus increased in vg^{no} larvae an increasing destruction of wing area can be observed with increasing time of development (Proc. Nat. Acad. Sci. *25*, 5). Precisely time tests indicated that no definite sensitive period exists for the effect of partial starvation. The effect is larger the earlier the larvae are transferred to peptone-food. After partial starvation the destruction always increases from the tip of the wing towards the base of the wing (scalloping). No definite sensitive period for complete starvation has been found as yet. The patterns of destruction are typically different if starvation is started severally at different times of larval development. Larvae which are completely starved for a 3 day period which starts before the larvae are 75 hours old develop into flies 80% of which always exhibit a destruction starting from the posterior margin of the wing (Bd-type). If the larvae are completely starved beginning at a time after 75 hours of larval age all hatching flies exhibit wing destruction starting from the anterior margin (Bx-type). An antler-like pattern of destruction results (60% of hatching flies) if the larvae were removed from all food at the age of 50 hours. Changes of developmental rates were produced by the same methods in some other mutants of Drosophila mel. It was observed that after increase in time of development Lobe eyes become normal, Curly wings straighten out (only in certain stocks) and the amount of extra venation is reduced in plexus stocks.

7. *The Study of Fish Predation.* KARL F. LAGLER, Beta Chapter, University of Michigan.

The study of fish predation is shown to be a research field of great promise as has previously been demonstrated by other workers for overpopulation and predation in birds and mammals. The data aid in the determination of management practices for predator and prey and yield information on fundamental and philosophical aspects of animal ecology.

The American, Red-breasted, and Hooded Mergansers and American Goldeneye are given as examples of the birds studied which are often considered as fish predators in Michigan. Of these, the American Merganser alone, and only under unusual circumstances, may have implications for fish management in this state. The mudpuppy is a so-called "noxious fish" which has been investigated. Musk, snapping, western painted, Blandings, soft-shelled and map turtles have been studied and of these perhaps only the snapper may significantly affect game fish populations. In general, wider and wiser use of methods of predator control which do not involve killing are recommended.

8. *The Relation of Bird Migration to Topography in Pennsylvania.* RICHARD C. SNYDER, Alpha Iota Chapter, Bucknell University.

This work was started with the idea of discovering any possible relationship between bird migration and topography in this state. It is well known that birds are influenced by the topographical conditions of the country as a whole, but a local study such as this will prove to be of interest in determining a similar relation in a smaller area. Pennsylvania is very favorable for such a study, being composed of many river valleys and mountains; the altitude between sea level and about 3,000 feet above.

It is recognized that most birds follow shore lines and river valleys on their migratory flights; hawks are an exception in that they follow mountain ridges. The normal route is a northeast and southwest course approximately parallel with the trend of the Atlantic coast; as the birds near their nesting grounds they may or may not deviate from this line to follow the courses of the larger rivers and mountain chains which lead to their particular areas. It must be said that this is a belief which is still largely theoretical and this project is an attempt to substantiate it for this locality.

The actual methods of this study were as follows: different points east and west across the state were selected as nearly on a straight line as possible; it so happens that the main areas fall near the 41st parallel of latitude. Region 1 is near the Allegheny River in Indiana county; Region 2 is at Lewisburg on the Susquehanna River, Union county; Region 3 is located on the Hudson River, New York. Several other points have been interspersed between these, namely, State College, Herrick Center, Tyrone, Wilkes Barre, and Altoona, Pa. The three main regions are located near the largest rivers; therefore, according to the theory, the birds should follow the river courses, and then radiate outward into the surrounding country. Their arrival dates would occur sooner on the rivers than they would in the other areas. By comparing the arrival dates of these regions, it was possible to discover that the birds actually arrive at the river localities at approximately the same time, and then followed a short period in which they reached the higher altitudes away from the rivers. The areas interspersed between the three main ones are, in all cases, a good deal higher above sea level than the ones near the rivers. Present and past year data was used to make the study as complete as possible.

A special study was made upon the migration of the Lewisburg and State College regions. By averaging the dates of three years observance in both places, it was discovered that the birds arrive in Lewisburg much earlier than they do in State College, although the latter city is only 60 miles away. This fact seems to point to the conclusion that the birds, in this case, follow the Susquehanna on their migratory flights and slowly spread outward to the higher areas.

The birds selected comprised 60 of the commonest species; so selected because they are regular common migrants and easily identified. Erratic migrants were not considered. The observers from whom records were obtained are not professional ornithologists but are qualified in that they are familiar with the birds and can accurately record their arrivals.

The results have been promising. The birds that have been studied (the ones in which an adequate amount of date was secured from all regions) arrive at about the same time along the three main regions. They arrive in Lewisburg on an average of 10 days earlier than they do in State College. Along the Susquehanna they arrive much farther north at the same time that they do in State College. The early migrants show a greater time span between arrivals at lower and higher areas than do the late migrants, which fact points out that birds follow the rivers because of the greater concentration of food, and stay near them until warmer weather opens the way to flights to greater elevations.

Only general conclusions are valid in such a report. Time necessitated only a rather brief study and leaves much to be worked on in future years. To make such a study complete, and to furnish lasting results, a similar study should be carried on for a good many years, using all the migrants possible and enlisting the help of as many observers who are willing to cooperate.

9. *Observations on the Leucocytes of the Earthworm.* Janet Clayton, Alpha Iota Chapter, Bucknell University.

The object of this study was to determine the structure and function of the leucocytes or coelomic cells of the earthworm. Most textbooks give little information about these cells beyond the fact that they are similar to the human leucocytes in appearance and that their function is probably similar to that of the human white blood cells.

A typical leucocyte is a colorless amoeboid cell, more or less spherical in shape. The pseudopodia are either small and pointed so that they give the cells a pin cushion-like appearance, or fuse to become rounded like those of an amoeba. The range in size of the cells, without the pseudopodia is from 8 to 26 microns, the average size being about 16 microns. The leucocytes of the small worms are somewhat smaller than this.

Little study has been made of the locomotion of the cells. They seem to move a little over six times their own length in an hour. This is much slower than the human cells move.

Although it has been supposed that these cells ingest bacteria, we have not found record of the process being actually witnessed. Dilute solutions of Trypan blue and of carmine were mixed with the lymph, and the cells were observed at frequent intervals. Within twenty minutes, particles could be seen that had *definitely* been ingested by the cells. These cells afford an excellent and available method for the demonstration of phagocytosis.

Another phase of this problem was to determine the length of time that the cells could stay alive outside of a worm's body. Single cells were kept alive for over forty-eight hours, and some cells in clusters were kept alive for over sixty-three hours at a temperature of 55°F.

Blood smears were stained with Wright's stain to see if distinct types could be found. We were surprised to find that they held a striking resemblance to the human types.

They may be grouped as follows: (a) Those similar to eosinophiles with large red granules in the cytoplasm—average approximately 31%. (b) Those similar to neutrophiles with five granules in the cytoplasm—average about 65½%. (c) Those similar to the basophiles, with large blue-black granules—almost none. (d) Those similar to hemoblasts (lymphoblasts) with large nuclei and few or no particles—average about 3.8%.

Intermediate stages of these are also found.

Future studies in this problem will be: a thorough study of the cell types; the study of the relation of eosinophiles to parasitism; the origin of the lymphocytes; and the temperature reaction of the cells.

10. *The Mosquitoes of Union County, Pennsylvania, with Notes on their Habits.* Cornelius Roughgarden, Alpha Iota Chapter, Bucknell University.
11. *Notes on the Skin and Quills of the Porcupine, Erethizon Geno Saccomanno,* Alpha Lambda Chapter, University of Utah.

Specimens of *Erethizon epixanthum epixanthum* were used for the materials of this paper.

In all sections of the skin which were examined the *epidermis* showed that the *stratum granulosum* is present in the regions examined and that the *stratum lucidum* is totally absent. The *derma* exhiibts no great peculiarity except that it is unusually highly invaded by sebaceous glands, which show an increase in size as the hypodermis is approached. The hypodermis is deep and consists essentially of fat tissue fordered at intervals by connective tissue fibers which extend perpendicular to the surface. The bases of the quills extend into the hypodermis, and groups of adjacent quills are connected by bands of connective tissue.

The quills and hairs are homologous, and there are three kinds of hair in the porcupine (Taylor, 1935, pp. 33-34). These hairs vary from very fine short hair to long quill-like ones.

The most peculiar feature about the quills is the base and barbs. The barbs have been described by Taylor (1935, pp. 36-37). As a quill grows the follicle from which it is developing becomes reduced in diameter so that when it is full grown the root is about one-fourth the diameter of the quill shaft. The papilla and the connective tissue about the follicle of the quill both degenerate during the quill's growth so that when a quill is full grown it is barely connected by its base and lies loose in a pocket of the skin.

The sweat glands are entirely absent. The sebaceous glands in the porcupine vary from only a few cells to some which are in excess of 8 mm. in diameter, or about four times as large as those of man. Some of these glands are too large to be embodied in the derma and as a result are found deeply imbedded in the hypodermis. There are from one to six of these glands found about the follicle of each quill.

The *arrector pili* muscles are found on some, but not all of the quills. They have their origin in the derma in the same place as those of hair, but their insertion is in the connective tissue at the base of the quill rather than at the center of the follicle, as in hair. The action of one of these muscles serves to manipulate several quills, because, as mentioned above, the quill bases are interconnected by connective tissue of the hypodermis. Each hair, however, has its own individual arrector pili muscle.

12. *The Study of Indian Dwellings in the Western Area of North America.* Carol Cox, Epsilon Chapter, University of Denver.
13. *A Comparison of the Bible with Modern Indian Folklore.* Cecilia Evans Sowers, Epsilon Chapter, University of Denver.
14. *A Functional Fourth Left Aortic Arch in the Kingfisher (Ceryle alcyon).* Fred H. Glenny, Eta Chapter, University of Akron.

The 4th left aortic arch is found as a persistent vessel in the Belted Kingfisher (Ceryle alcyon)—for specimens taken in the vicinity of Akron, Ohio.

Prior to the 20th Century, only two somewhat similar anomalous conditions had been reported in birds. Whereas this vessel is not reported as being "functional" in *Spizoetus* and *Aceros*, it is to be considered as a functional artery in *Ceryle alcyon.*

Anteriorly, the 4th left aortic arch does not join any other arteries from the heart, nor does it form any other direct connection, at its anterior end, with the heart.

The 4th right aortic arch does not arise as a branch of the right innominate artery as is generally expected in birds, but arises as a separate trunk from the aortic root.

15. *Diatom Survey of the Ohio Canal and Hower Lake, near Akron, Ohio.* Bill J. Barkley, Eta Chapter, University of Akron.

Plankton diatom collections were made in Hower Lake, and the Ohio Canal, near Akron, Ohio from March to August 1938.

Purposes of the investigation were: (1) to determine relative abundance and monthly distribution of diatom genera, and (2) to compare the genera of the lake with those of the slowly moving water of the canal.

Collections were made with a two liter Foerst Improved Water Sampler. After centrifuging, 1-2 c.c. of Commercial Formaldehyde, and 2-3 c.c. of Conc. H_2SO_4 were added, the latter dissolved the organic material simplifying examination. A Sedgwick-Rafter counting cell and Whipple ocular micrometer were used. Permanent mounts were made with the help of an original isolation apparatus.

The eight common genera, Navicula, Asterionella, Synedra, Fragilaria, Stauroneis, Gomphonema, Cymbella, Cyclotella, were tabulated.

Navicula were on the whole more common in the canal; Asterionella, Synedra, Stauroneis, and Gomphonema more common in the lake; while Fragilaria, Cymbella, and Cyclotella were about evenly distributed.

In the canal, Navicula, Fragilaria, Stauroneis, and Cymbella were more common in May; Asterionella and Synedra in April; Gomphonema, and Cyclotella in June.

In the lake, Navicula, Synedra, and Stauroenis were more common in March; Asterionella, Cymbella, and Cyclotella in April; Gomphonema in May; and Fragilaria in August.

16. *A Preliminary Report on the Specificity of Lenticel Characteristics in the Oaks.* Fred H. Glenny, Eta Chapter, University of Akron.

Classification and identification of the oaks has been based on various morphologic characteristics. These characteristics are, however, of only seasonal value since they can be used only during limited periods of the year.

It was observed that the lenticels of various species of oaks differed in details of structure, but within a single species of oak the characteristics were reliably constant. The lenticels remain the same throughout the year, and may, therefore, be used alone or in conjunction with other characteristics as a means of species identification.

Lenticels of oaks are typically mound-shape, vulvate, grooved, or irregularly fissured. The number of lenticels on a twig remains relatively constant irrespective of twig size.

Previous workers appear to have overlooked the possibility of using the lenticels of woody plants as a means of identification.

17. *Biotic Succession in a Salt Marsh.* R. Elaine Walker, Omega Chapter, University of Oklahoma.

18. *The Algae of Crystal Lake.* Dorothy V. Leake, Omega Chapter, University of Oklahoma. (By Title)

19. *Physiological Studies of Pollen Germination and Tube Growth in Relation to Various Growth Substances.* Paul F. Smith, Omega Chapter, University of Oklahoma. (By Title)

20. *The Effect of pH on the Hemolysis of Chicken Erythrocytes.* L. D. Stringer, H. D. Weiss, and F. R. Hunter, Rhode Island State College.

A suspension of chicken erythrocytes in a very hypotonic solution fails to clear in the usual manner under certain circumstances. It has been found that when the hemolytic solution is slightly acid (pH 6.5 or less) the ghost cells clump, and about 20-40% of the hemoglobin fails to be released from the cells. At a more alkaline pH the suspension clears in the usual manner.

Evidence at present suggests that a small amount of hemoglobin is retained by all of the cells, rather than that some of the cells are made very resistant by the acid and do not lose any of their hemoglobin.

The cause of the clumping of the ghost cells is unknown, although in working with nucleated erythrocytes one frequently finds unhemolyzed as well as hemolyzed cells forming a sticky mass.

21. *The Effect of the Application of Certain Nutrient Solutions on Seeds.* Philip C. Walker, Alpha Epsilon Chapter, University of Pittsburgh.

During the past two years a series of experiments dealing with the effect of nutrient solutions and various growth promoting substances on germinating seeds have been conducted at Phipps Conservatories, Schenly Park, Pittsburgh, Pa. The results have been, on the whole, favorable. One hundred and thirty different species and varieties of perennial and annual flower seeds have been sown in steam-sterilized sand in six inch seed pans. Similar controls were set up for each species in sterilized, rich potting soil. These sand cultures were watered with a nutrient solution modified after that of Hill-Davis, Ottawa Experiment Farm, Canada, and G. Poesch, Department of Floriculture, Ohio State University. A sodium metaphosphate was substituted for a calcium phosphate carrier in the original solution and these two solutions were compared throughout the experiments. A greater percentage of good seedlings resulted from the sodium metaphosphate solution. In over eighty cases out of the original one hundred and thirty species tested the seeds germinated sooner and the seedlings grew faster and in larger numbers in the experimentals than in the soil. This can be attributed to a more available and balanced supply of nutrients in the tests and the low rate of occurrence of "damping-off fungus" in the sand medium. A selection of forty-two of the best seedling species treated further with solution in sand, thirty responded more favorably in leaf size and in numbers, and flower bud production than in the soil checks.

In later experiments Rootone and Vitamin B_1 added separately before sowing to various species of seed resulted in no increased germination or seedling growth, in fact, a definite retardation was the effect in many of the Rootone-treated species. At the present time experiments on Colchicine-treated seeds are under way.

The application of the nutrient solution sand culture method to the propagation of plants which must be grown from seed, affords the commercial greenhouse grower a means of; (1) speeding the growth of seedlings to the "pricking-off" stage; (2) increasing the number of healthy seedlings; (3) facilitating greater ease in transplanting to soil for later growth stages, and; (4) lowering the loss of seedlings through damping-off fungus.

22. *Some Aspects of Bog Development in Unglaciated Pennsylvania.* Alta Schrock, Alpha Epsilon Chapter, University of Pittsburgh. (By Title)

The area under consideration lies on Negro Mountain Anticline in Somerset County, Pennsylvania, within the confines of the Alleghany Mountain Section of the Appalachian Plateaus Province, an unglaciated section characterized by gentle anticlinal folds, poor drainage, and hard-capped ridges. These factors, together with several others form maximum conditions for bog development on Negro Mountain.

(1) Structural weaknesses resulting from mountain-folding. (These expressing themselves both longitudinally and cross-wise) (2) differential erosion, wearing away all rocks in weaker areas, (3) resistance and porosity of rock crests skirting the cavity thus formed, (4) exposure of several limestone layers, hastening erosion on the plunge of the fold, (5) distance from main drainage lines and indirectness of stream courses, (6) opening of numerous springs on the inner edge of the anticlinal cavity, (7) differential clogging of the basin by inwash from the softer Mauch Chunk shale slopes, giving rise to marsh conditions, (8) pools and sphagnum mounds in local areas, resulting in bog formation.

The formation of a local bog on the

margin of the marsh studied appears to be due to: (1) alcove position, (2) absence of near-by slopes, (3) distance from sediment-laden streams, (4) feeding by sandstone springs and absence of active limestone springs, (5) accumulation of humic derivatives.

The soil profile of this bog seems to indicate the following history: (1) rock decay and a period of erosion much more rapid during steep grade, (2) prolonged inwash of sediments, now dark red in color, (3) continued inwash of sediments, later reduced to a dull gray due to standing water, (4) a clogged drainage, causing local algal pools and sphagnum hummocks, (5) ecological development from bog-meadow to forest, (6) a heavy fire, attended by bog sinking and destruction of the forest, (7) reversion to Cranberry-Sphagnum Meadow, (8) recent drainage changes, little change in vegetation.

⁂

Gratis Employment Service

FOR PHI SIGMA MEMBERS

◆

Are you completing a degree this June? Do you want some publicity by your society to help you find opportunities for continuing work in your chosen field? If so, send typewritten copy modelled after the following to the editor-in-chief.

Mr. John Doe. Age, 23; A.B., Univ. Montana '39; M.S., Univ. Wisc. '40. Zoology Major; Botany Minor. Desires assistanship for work leading to Ph.D. in Zoology. (Embryol.).

Material sent before April 1, 1940, will be published in the next issue of the *Biologist* at the expense of your society. These notices will be limited to five or six lines each. In addition to reaching all active members and subscribers, the *Biologist* will be sent to all heads of biological departments in institutions where there are Phi Sigma chapters.

◆

Here's Help for the Asking!

New Books

The thumbnail sketches of current biological literature appearing in this section are not meant to be exhaustive or deeply critical. They aim to survey the rapidly growing field of biology. Naturally these reviews represent the candid opinions of various readers not necessarily those of members of the National Council, nor even those of the Editor.

AMERICAN MAMMALS, W. J. HAMILTON, JR., *McGraw-Hill Book Co., New York, 1939. $3.75.*

Drawing extensively upon "The Journal of Mammalology", this ecological study will disappoint the usual animal-story hunter who might be looking for the typical anecdotes. Here the animal, or animal group, is only incidental to the ecological characteristics or habits involved. It is the first mammalogical work to approach the subject from this angle, and as such will be welcome.

BACTERIOLOGY, WILLIAM W. FORD, *Paul B. Hoeber, New York, N. Y., 1939. $2.50.*

This is the twenty-second volume in the "Clio Medica" series of primers on the history of medicine. It is a scholarly little study, with a much more extensive bibliography than one would expect in any pocket volume.

BASIC METHODS FOR EXPERIMENTS ON EGGS OF MARINE ANIMALS, E. E. JUST, *P. Blakiston's Son & Co., Philadelphia, 1939.*

Anyone who contemplates research on the eggs of animal forms will profit from a careful reading of this slim, spiral-bound monograph. Incidentally the meticulous care the author enjoins on the prospective experimenter makes his own research so much the more worthy of reliance. The methods discussed include both living cultures and the making of fixed preparations.

BIOLOGICAL DRAWINGS, M. JEPSON, *John Murray, London, or, Chemical Publishing Co., 148 Lafayette St., New York, N. Y., 1939. $2.00.*

There are two parts to this work which were originally published separately in England. This edition combines both. It consists of some 114 8½x11½" pages literally covered with all the drawings that might be demanded in the most exacting of biology courses. The English, it seems, have also come to the conclusion that there is little to be gained in demanding hours of student drawing exercises and calling them biological laboratory work.

THE BOOK OF FISHES, EDITED BY JOHN OLIVER LA GORCE, *National Geographic Society, Washington, D. C. $3.50.*

This is a revised edition of the collected articles on fish and fishing which have appeared in the National Geographic Magazine in the twenty-year period from 1919 to 1939. Anyone who is familiar with the effective use this periodical makes of color-photography and color-illustrating will want to possess this book. The authority of the various authors is an added incentive.

A BRIEF ANATOMY OF THE TURTLE, G. A. & E. R. NOBLE, *Stanford University Press, Stanford University, 1940. $1.00.*

This handy, paper-bound, seventy-page laboratory manual was written to supply a need for which the authors found no adequate provision in our teaching literature. The number of clearly executed drawings and the twenty-one plates of white and black illustrations make it a desirable adjunct to the comparative anatomy laboratory, either as a reference, or as an outright text.

THE CARE OF A SMALL RAT COLONY, R. J. MAIN, *The C. V. Mosby Co., St. Louis, 1939. $2.00.*

So many laboratories require the use of rats for experimental purposes that it is a wonder that some sort of similar work has not appeared long since. The author is connected with the department of Physiology and Pharmacology at the Medical College of Virginia. As the report of an experienced hand it deserves attention.

ELEMENTS OF HUMAN PHYSIOLOGY, MIRIAM S. LUCAS, *Lea & Febiger, Philadelphia, 1940. $4.50.*

This is text-book for students from the student's angle, not from the research worker's. The author is still close enough to her own student days to appreciate the difference. Given the option between a specifically medical textbook for a college course in human physiology, or something like this offering the instructor should not find it hard to choose.

EYES IN THE NIGHT, TAPPAN GREGORY, *Thomas Y. Crowell Co., New York, 1939. $3.50.*

This is a fascinating book on wild animal photography by night. The pictures are excellent,—what there are of them;—the directions for taking up this interesting hobby with some hope of success are satisfying full and complete.

FLOWERING SHRUBS OF CALIFORNIA, LESTER ROWNTREE, *Stanford University Press, Stanford University, 1939. $3.00.*

Anyone who has travelled or lived in California will appreciate this book. To the expectant visitor it should prove a revelation. It will be valuable to the general ecologist and to the amateur taxonomist. The style is interesting, and the illustrations are well chosen.

THE GEESE FLY HIGH, F. P. JAQUES, *University of Minnesota Press, Minneapolis, 1939. $3.00.*

Nature lovers will become enthusiastic about this book. Ecologists will enjoy it. To the ordinary reader it will be interesting, both for its subject matter as well as the way it has been treated. Anyone who has a taste for art will appreciate the effective use of black and white sketches on nearly every page by Francis Lee Jaques.

THE GREAT NATURALISTS EXPLORE SOUTH AMERICA, P. R. CUTRIGHT, *The Macmillan Co., New York, 1940. $3.50.*

Instead of writing a bibliography of naturalistic explorations, the author of this volume gives us a brief resume of the South American trips of Humboldt, Bonpland, Waterton, Charles Darwin, Schomburgk, Edwards, A. R. Wallace, Bates, Hudson, im Thurn, Pritchard and Andre, among the older explorers, and Beebe, Miller, Murphy and Cherrie among the more recent. Then he launches into a series of life-histories which range from the vampire bat through the armadillos, tapirs, guanacos, hoatzins, piranhas, to wind up with the butterflies.

HEREDITY AND SOCIAL PROBLEMS, L. L. BURLINGAME, *McGraw-Hill Book Co., New York, 1940. $3.50.*

This is a new work which should fill a very definite place in sociological studies, since it presents the results of genetic research in their application to such problems as education and government, insanity and crime, medical problems, mental deficiency, race problems (now more than ever a ticklish subject), war and migration, and the analysis of population problems.

HISTORY AND SCIENCE, HUGH MILLER, *University of California Press, Berkeley, 1939. $2.00.*

The announcements of the University Press call this "A challenging philosophical discussion, the avowed purpose of which is to free empirical science from the ghosts of the rationalistic past that still haunt and mislead its progress". A casual inspection of the work leads one to suspect that it lives up to the aforesaid description, which, in itself, is rather remarkable.

HOW TO KNOW THE TREES, H. E. JAQUES, *Published by the Author, Mt. Pleasant, Iowa, 1940. Spiral binding, $1.00; cloth, $1.80.*

The indefatigable professor of biology at Iowa Wesleyan College is out again with another popular key in his "Pictured-Key Nature Series". There is a lot of information packed into small space in these manuals. Each species has a description of the form, its bark, leaves, flowers, and fruit, its commercial uses, a sketch of its distribution as well as some of its characteristics. There is also a space left to insert census figures as to numbers, and the location of nearby typical forms.

HUMAN HELMINTHOLOGY, E. C. FAUST, *Lea & Febiger, Philadelphia, 1939. $8.50.*

This is the second edition of a textbook by the director of Tulane University's Department of Tropical Medicine. The original work is well known among parasitologists, and this revised edition which brings the rapidly developing information on tropical infection up to date will be equally welcome.

THE INDOOR GARDNER, D. T. ABBOTT, *The University of Minnesota Press, Minneapolis, 1939. $1.50.*

People who grow plants inside for pleasure, profit or scientific purposes will enjoy this chatty little book written by a housewife "for other busy people, for whom time is at a premium and the children and the cat are more important than the flowers".

KEY TO THE SPECIES OF RIBES OCCURRING IN THE GREAT LAKES REGION, H. T. DARLINGTON AND L. B. CULVER, *Michigan State College Agricultural Experiment Station, East Lansing, 1939.*

Gooseberries and currants are hosts to the white pine blister rust. This key will serve a double purpose in the identification of the more dangerous species, since there is a considerable variation in susceptibility to the infection.

A LABORATORY MANUAL OF VERTEBRATE EMBRYOLOGY, F. B. ADAMSTONE & W. SHUMWAY, *John Wiley & Sons, New York, 1939. $1.25.*

Based on the frog, chick and pig embryos, this laboratory workbook permits of considerable latitude in organizing a course to suit almost any type of one-semester offering. There are plenty of opportunities for sketching in the course, but the time of the student is wisely husbanded for extensive observation and correlation in both the living and the fixed specimens.

THE LIFE AND DEATH INSTINCTS, A. N. FOXE, *The Monograph Editions, 25 W. 54th St., New York, $2.00.*

This curious book on the vita and the fatum is the result of years of study of Freudian psychiatry and its application is in an Eastern prison.

MAGIC GARDENS, R. E. CLARKSON, *The Macmillan Co., New York, 1939. $3.00.*

This is an interesting book, dealing as it does with the use of herbs, the "yarbs" of the mountain folk, those aromatic, and spicy vegetables with which our grandparents loved to savor their foods. The book gives both the history and the technique of growing these herbs, as well as their use.

A MANUAL OF THE LIVERWORTS OF WEST VIRGINIA, N. AMMONS, *At the University Press, Notre Dame, Ind., 1940. $1.75.*

This slim, 164-page volume is a reprint from the January "Midland Naturalist". As a study of the state bryophytes it will have a claim on the attention of botanists from all the surrounding area, and in particular those who are interested in the hepaticae anywhere.

THE MAYAWYAW RITUAL, FRANCIS LAMBRECHT, *Catholic Anthropological Conference, Washington, D. C., 1939. $2.75.*

This is the fourth number in a series of studies on the Mayawyaw Ritual, and deals with their property concepts and the ritual connected therewith. Anthropologists will be particularly interested in it, as they have been in its predecessors.

THE MICROSCOPE, R. M. ALLEN, *D. Van Nostrand Co., New York, 1940. $3.00.*

This most recent of works on the microscope carries with it additional chapters on the testing of microscopic equipment, and the preparation of material for microscopic examination.

THE MICROTHYRIACEAE, F. L. STEVENS & SISTER M. H. RYAN, *University of Illinois Press, Urbana, 1939. $1.50.*

This is the monograph on which the late professor of plant pathology at Illinois was engaged during the latter years of his life, and which he requested the junior author to complete if anything should happen. Dr. Stevens died in 1934 and the request has been carried out by Sister N. Hilaire of Rosary College.

MODERN METHODS AND MATERIALS FOR TEACHING SCIENCE, E. D. Heiss, E. S. Obourn & C. W. Hoffman, *The Macmillan Co., New York, 1940. $2.50.*

Students in teachers' colleges who are interested in the principles of science teaching, and the materials or devices for the work will appreciate this practical manual.

MOSSES OF THE PHILIPPINES, E. B. Bartram, *Division of Publications, Dept. of Agriculture and Commerce, Manila, P. I. $2.00.*

Students and collectors of mosses will want to see, study or own this massive monograph. There are 423 pages of text, including a key, descriptions of 180 genera, and some 27 plates additional containing 510 sets of sketches illustrating the text.

NATURAL HISTORY OF THE BIRDS OF EASTERN AND CENTRAL NORTH AMERICA, E. H. Forbush, revised by J. R. May, *Houghton Mifflin Co., Boston, 1939. $4.95*

With about 700 illustrated forms in color from the brushes of L. A. Fuertes, A. Brooks and R. T. Peterson, this large tome, sponsored by the Massachusetts Audubon Society, is one of those rarely reasonably priced volumes which put them within the reach of the average bird lover's purse.

THE NOTEBOOKS OF LEONARDO DA VINCI, E. MacCurdy, *Reynal & Hitchcock, New York, 1939. $5.00.*

Here are 1247 pages selected from the writings of the great Italian genius, painter, engineer and scientist. They have not been arranged in chronological order, but rather under various topics which reflect the manysided virtuosity of his extraordinary ability. There is sufficient and to spare of biology in the combined volumes to make it worth our attention.

NUTRITION AND PHYSICAL DEGENERATION, W. A. Price, *Paul B. Hoeber, New York, 1939. $5.00.*

"Dr. Price has found out why primitive men have good teeth and why their teeth go bad when they become 'civilized'. But he has not stopped there; he has gone on to apply his knowledge acquired from savages to their less intelligent civilized brothers. For I think we must admit that if savages know enough to eat the things which keep their teeth healthy, they are more intelligent in dietary matters than we are. So I consider that Dr. Price has written what is often called 'a profoundly significant book.' " *Earnest A. Hooten, in the "Foreword".*

THE PRINCIPLES OF INSECT PHYSIOLOGY, V. B. Wigglesworth, *E. P. Dutton & Co., New York, $8.00.*

Of more than usual originality is the approach the author makes to the problem of insects, pestiferous or otherwise. He studies the various structures and functions, particularly the latter, of the different forms, and from them points the possibility of new approaches to insect control.

PLANTS OF SUN AND SAND, S. Stevens, *The Print Room, Tucson, Arizona, 1939.*

This is a unique little volume for desert lovers, bound in covers of plain wood, and illustrated with many choice etchings of desert forms.

THE RISE OF EMBRYOLOGY, A. W. Meyer, *Stanford University Press, Stanford University, 1939. $6.00.*

Of recent years there has been a welcome and much needed flood of excellent histories devoted to the various phases of science, especially biology. This new work on embryology is a distinct contribution to science-history, worthy of place in every biological library.

A SHORT HISTORY OF SCIENCE, W. T. Sedgwick & H. W. Tyler, *The Macmillan Co., New York, 1939. $3.75.*

This is a revised edition of a work which first appeared in 1917. Dr. Sedgwick has since died, and the revision was completed by Dr. R. P. Bigelow and Dr. Tyler. The book has not profited much as far as the first edition's attitude toward early science is concerned. The first edition was unquestionably influenced by A. D. White's "History of the Warfare of Science and Theology", and, as a result we find that Galileo, (whose "torture" has been pretty badly exploded,) still receives eleven references, while Stensen, Spallanzani, and even the Reformation are mentioned only once. Biologists will wonder why

Malphigi gets only a few references, the Herbals and the Bestiaries are ignored. Perhaps this is due to the fact that this is an abridged history of all the sciences. If this be so one would expect Leonardo da Vinci to occupy a larger space than the three brief references allotted to him.

SIFTINGS, Jens Jensen, *Ralph Fletcher Seymour, Pub., 410 So. Michigan Ave., Chicago, 1939. $2.50.*

Under this non-committal title are gathered a group of essays by one of the most interesting characters ever to have practiced the art of the landscape architect in this country. Jens Jensen is a Scandinavian by birth, a Middle Westerner by residence. He knows the economic, the artistic, and it is not hard to see, the spiritual significance of every middle western tree, shrub, and plant available in our wildwoods to the artist who wants to deal in natural, not artificial, beauty. This is a book for biologists who like their side-reading salted with philosophy.

STUDIES IN THE DEVELOPMENT OF YOUNG CHILDREN, N. Bayley, *University of California Press, Berkeley, 1940.*

This little lithoprinted 45-page booklet will be of more interest to psychologists than to biologists,—unless perhaps they are married. It is so scientifically exact, and so engagingly done, that young parents,—or old for that matter,—will enjoy, and perhaps profit by it.

A STUDY GUIDE FOR BIOLOGY, B. McAvoy, *Burgess Pub. Co., Minneapolis, 1939. $2.00.*

This is a high-school work-book for laboratory exercises. It is spirally bound, and lithographed, and offers some rather off-the-beaten-track types of studies with an accent on human structures that is encouraging.

STYLE TRENDS OF PUEBLO POTTERY, H. P. Mera, *Laboratory of Anthropology, Santa Fe, 1939.*

This monograph, the third in its series, is a valuable addition to our knowledge of early Indian art, uncontaminated by modern, or even Caucasian, influences. It should be of interest to anthropologists particularly.

A TEXTBOOK OF HISTOLOGY, E. V. Cowdry, *Lea & Febiger, Philadelphia, 1938. $7.00.*

This is the second edition of a work which by sheer merit has come to be regarded as our American classic contribution to general histology. It is a large volume, imperial octavo, of some 600 pages, half as many illustrations, some in color, and a bibliography of twenty-two pages,—an altogether compendious book for reference where it may prove too extensive for class work.

TEXTBOOK OF PALEOBOTANY, William C. Darrah, *D. Appleton-Century Co., New York, 1939. $6.00.*

Biology instructors who have had to rely on the historical sections of many geological texts for their information regarding early evidences of life will welcome this contribution to our biological reference literature. The book is profusely illustrated.

UNDER YOUR FEET, B. B. King, *Dodd Mead & Co., New York, 1939. $2.50.*

Anthropologists, and those interested in pre-Columbian history, will want to see this book. It is the first single volume devoted to that little known group of Indians which we call "The Mound Builders". It will be a matter of some surprise to the curious to learn how extensive the remains of this people really are.

VITAMIN D, C. I. Reed, H. C. Stuck, & I. E. Stuck, *The University of Chicago Press, Chicago, 1939. $4.50.*

This monograph on the chemistry, physiology, pharmacology, pathology, and the results of experimental and clinical investigations on Vitamin D, is the joint product of three physiologists at the University of Illinois College of Medicine. It will be an important contribution to the growing literature on the vitamins,—a matter of more than ordinary significance since the vitamins are not merely the property of the physician or the physiologist,—they have captured the imagination of the man in the street.

Within Reach of Your Chapter Finances

INITIATION INSIGNIA

Does your Chapter carry out the Ritual of Initiation properly? In other words, has your Chapter the model Phi Sigma Key and the large Phi Sigma Coat of Arms required by the Ritual? They are both in easy reach of every Chapter's finances.

The Model Key, furnished in two colored gold, costs only $1.75.

The Coat of Arms, hand-colored on 12x16 heavy paper, only $1.25.

Address all orders, and make all checks payable to the Secretary, Dr. A. I. Ortenburger, Department of Zoology, University of Oklahoma, Norman, Oklahoma.

PHI SIGMA JEWELRY

Membership keys may be obtained from the National Treasurer through Chapter Treasurers, or directly. In the latter case give your name, Chapter and year of initiation, *plainly*.

REVISED PRICES OF KEYS

These prices given include the Federal Tax when required.

Standard Size (official) 10K gold	
Swivel ring top	$5.50
Stationary ring top	5.00
Swivel ring top; mounted as pin; safety clasp	6.75
Stationary ring top; mounted as pin; safety clasp	6.25
Small Size 10K gold	
Swivel ring top	5.00
Stationary ring top	4.50
Stationary ring top; mounted as pin; safety clasp	5.50
Green gold keys, additional	2.00
White gold keys, additional	5.00

To the foregoing prices 10% must be added to meet the changing price of gold.

Address correspondence to:

MR. ERWINE HALL STEWART,
Treasurer of Phi Sigma,
Mesa, Colorado

SUBSCRIPTION BLANK

Detach this page, fill out blank spaces, include check or money order and mail to Mr. Stewart.

Date..............................

To MR. E. H. STEWART,
Treasurer of Phi Sigma,
Mesa, Colorado.

Dear Mr. Stewart:

I am enclosing $............... for my subscription to THE BIOLOGIST in the class checked on the schedule below:

1 Year:	$ 1.00......
3 Years:	$ 2.50......
5 Years:	$ 4.00......
10 Years:	$ 7.50......
25 Years:	$15.00......
Life Sub:	$25.00......

Name ....

Address ....

....

The Duties Of The Chapter Secretary

●

To the National Secretary:

1. At the beginning of each school year furnish the names *and* addresses of chapter officers.
2. Order all chapter supplies well in advance of time needed.
3. Order certificates at least two weeks before initiation date.
4. Send initiation fees and membership record blanks at time certificates are ordered.
5. Be sure that copies of THE BIOLOGIST are received by *all* members including faculty and honorary members.

To the National Treasurer:

1. Furnish a correct list of chapter officers and addresses.
2. Inform the national treasurer at least a month in advance of the correct number of BIOLOGISTS needed for all your members.
3. Report names, serial numbers and date of initiation of each initiate at time certificates are ordered.

To the Editor:

1. Furnish a correct list of chapter officers and addresses.
2. Send chapter news letters for BIOLOGIST at least four weeks in advance of publication.
3. Send in copies of outstanding biological lectures or addresses (not however research reports) delivered at your institution.
4. Send in helpful suggestions or constructive criticisms concerning THE BIOLOGIST.

STATIONERY

Fine stationery is impressive. Club together for quantity orders to get 75c (or less) boxed stationery. Write for *Free Samples.*

INVITATIONS—PROGRAMS

Maintain your high social rating for parties. Select different and unique invitations and programs by Balfour. Write for *Free Samples.*

FAVORS AND LEATHER

Favors to fit your budget and put your party over. Leather is the thing this year. Write for *Free Copy* of the *Blue Book.*

FOR BETTER SERVICE
please give us full information:
(1) Quantity. (2) Kind of merchandise. (3) Idea for which to be used—such as party motif. (4) Quality. (5) Budget.

1940 BLUE BOOK

New and distinctive gifts and favors are brought to you in all their colorful appeal. Fine rings, lockets, bracelets, gifts, favors. Paste *Coupon Below* on penny post-card and mail to us today.

★ **CLIP THIS COUPON** ★

....
date

L. G. BALFOUR COMPANY
Attleboro, Massachusetts

Gentlemen:
Please send me the following:

☐ Stationery Samples
☐ Invitation Samples
☐ Program Samples
☐ 1940 Balfour Blue Book
☐ *Have a salesman call*

Name..............................
No. Street..............................
City-State..............................

PROTECTION

ANCIENT AND MODERN

The ancient shields hang on the walls of the old castles—symbolic of the protection given in bygone days.

Today protection is provided for those things which we hold dear, by constant vigilance and cooperation. Your insignia stands as the proud emblem of your membership in Phi Sigma Society.

In it has been built the symbolism of ideals exemplified in your initiation.

As your official jeweler, it is our privilege and duty to protect this insignia—first, by the maintenance of quality and price; and, second, to keep it from falling into hands of non-members.

During the dark days of 1918, we maintained insignia specifications and prices at great sacrifices. The price of gold zoomed, Government restrictions drastically curtailed supplies, taxes multiplied—and again today, we are faced with the same problem. Yet badge prices are lower now than twenty years ago.

Protection must be carried further in order to discourage indiscriminate manufacture of your insignia. You are urged to make purchases only through the channels set up by the officers whom you have selected.

◆

BUY ONLY FROM YOUR OFFICIAL JEWELER

L. G. BALFOUR
COMPANY
ATTLEBORO, MASSACHUSETTS

In Canada ✕ ✕ *Write or visit your nearest* **BIRK'S** *store*